THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—29TH YEAR. SYDNEY, SATURDAY, NOVEMBER 21, 1942. No. 21.

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ARMS AND ANOPHELINES, OR THE MILITARY SIGNIFICANCE OF MALARIA.[1]

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IT is my pleasing duty to deliver the annual address to this society. Once a year we forsake the strictly clinical and devote our attention to matters of more general interest. In choosing a subject I have been guided by the custom prevalent in recent years of presenting historical backgrounds in medicine. This precedent, I think, is a good one, and I shall endeavour to follow suit with a topic suggested by my own experience in the Great War.

Palestine and Syria: 1918.

At the time of which I speak, I was a participant in Allenby's campaign which drove the Turks out of Palestine, Syria and Transjordania. The war in this theatre was waged through territory notorious for endemic malaria; it is not surprising, therefore, that both contestants were severely punished by this disease. The inevitability of epidemic occurrences might well have been predicted by anyone in possession of the available epidemiological data.

Empirically it had been found that the introduction into infested communities of large numbers of unprotected persons invariably resulted in severe epidemics. Further, it was known that outbreaks of malaria were likely to follow engineering works, such as military entrenchments, which interfered with natural conditions of mosquito breeding.

The most convincing evidence of the military importance of malaria in this theatre of war was afforded by the testament of history. The regions in which Allenby fought had been cockpits for centuries; his battlefields were familiar to many a warrior of the past, and always it was the same story; malaria had proved a formidable adversary and had grappled impartially with Egyptian, Assyrian, Hittite and Jew, with Saracen Arab and Christian Knight, with Turkish janissary and soldier of Napoleon.

From the time that Abner fought the battles of King David to the time when Allenby led the last Crusade, Megiddo or Armageddon has ever been a key position. Doubtless also it has ever been a hotbed of malaria. Current interpretation of scripture regards Armageddon as the last great battle-ground of the forces of good and evil; but the passage may easily be given another meaning. In the relevant chapter (Revelation XVI), which is devoted to describing the distribution of the seven plagues by seven angels from seven vials, verses 16 and 17 read as follows: "And he gathered them together into a place called in the Hebrew tongue Armageddon and the seventh angel poured out his vial into the air." This reference to a plague of the air might readily be taken to indicate malaria, which, prior to the discovery of its true nature, had usually been attributed to miasmic emanations.

At all events, history will always associate Allenby, Armageddon and Anopheles. Allenby found an active but treacherous ally in the anopheline mosquito when he set out to envelop the flank of von Sanders by way of Armageddon. For nearly a year before he struck the final blow, he pinned the Turks to a line encompassed by malaria, knowing full well that his medical service was better than theirs. Racked by disease, weary of war and imbued with a bitter hatred of their bullying German masters, the Turkish troops were in no state to withstand the tremendous onslaught that was being prepared in September, 1918.

[1] Read at the annual meeting of the Alfred Hospital Clinical Society in November, 1939.

The Operations Described.

The plan of the British Commander-in-Chief was at once both simple and bold; his use of cavalry in particular constitutes a text-book model for most military schools and academies.[1]

Disease, Damascus and Colonel T. E. Lawrence.

After the complete envelopment and capture of their Seventh and Eighth Armies in Samaria, the Turkish Fourth Army in Transjordania commenced to withdraw towards Damascus. Many of its detached elements were defeated by Chaytor's force, but the main body managed to extricate itself and retired north along the line of the Hedjaz railway. A race for Damascus ensued, with Allenby's cavalry and the Arabs in hot pursuit; a sorry few of the hard-driven Turkish Army ever reached that ancient and historic city.

Since the fall of Damascus twenty-one years ago, many a stricken city has been added to war's catastrophic catalogue. Familiarity with the grim chronicle has made us callous to the shocking tale. The disaster that befell Damascus, however, was not in the modern style. Though in a sense it was an attack from the air, the vehicle of destruction was no mighty bomber; the messenger of death was borne on the wings of a tiny mosquito.

The shambles of Damascus left nothing to the imagination of the diminutive medical units that first entered the town. The Barada Gorge, through which passed the city water supply beside the road and the railway to Beirut, was choked by enemy dead and wreckage of every kind. The Kadem Station and petrol supplies had burnt to high heaven on the night of September 30. Though small parties of starving and helpless Turks were roaming at large or lying moribund in the gutters, the main body of fugitives from the south had collected in the Baramkie Barrack Square. The barracks itself had been converted into an improvised hospital; but Red Crescent personnel (doctors and orderlies) had deserted their posts and had left the inmates to fend for themselves. Malaria, dysentery, thirst and starvation were in sole control.

It was in such circumstances that I met the enigmatic and fame-enduring T. E. Lawrence. For political reasons the Emir Feisal and his advisers had been nominated to administer the town; Damascus was to be the capital of a new Arab kingdom. Owing to sheer incapacity and the lawlessness of the Druses and other casual followers, the Arab administration collapsed after three days, and General Sir Harry Chauvel (Commander of the Desert Mounted Corps) assumed control. Australian Light Horse had cleared the barrack square of its ordinary ambulatory prisoners soon after the occupation, but within the building hundreds of patients remained unattended. On the morning of the fourth day I was ordered to deputize for the Deputy Director of Medical Services and confer with Colonel Lawrence on the spot. At the time appointed, having thrown the reins of my horse over the cast-iron pickets of the enclosure, I awaited the arrival of the blue-eyed Emir. I had not long to wait before he stepped from a dusty Rolls-Royce chassis which drew up beside me. Lawrence wore spotless white bedouin dress (*kufiyeh, agbiyeh*) and a gold-hilted shereefian sword which marked his princely rank. Together we threaded our way through the litter of accoutrements in the courtyard towards the main portico of the building. We had not proceeded far on our inspection when the sensitive Lawrence desired to be excused; this man of high adventure and natural courage had no stomach for this sort of thing. Unburied dead sullied the courtyard; dead men fixed us with a stare from every angle of the entrance hall; dead men encumbered the stone stairways; dead men filled a fifth of the hospital beds. The survivors, either maniacal or comatose, were surrounded by abomination indescribable; there were putrid bodies and loathsome odure on every hand. Incompetent latrines had overflowed till every corridor was awash with liquid excrement. Window-casements had been used as middens and scores of window-sills, thus defiled, dripped with fæcal stalactites. Little wonder that I finished the round alone!

Lawrence and I returned to corps headquarters, where we were permitted to cool our heels awaiting the staff officer who had been detailed to receive us. This Indian Army major, a handsome "sahib of the sahibs", was apparently late for breakfast and had not finished shaving. When he did arrive, he prepared to devour bacon and eggs during the interview. This was too much for Lawrence, who straightway "packed up", and I "imshied" to report to my divisional commander.

I have never been able to fathom the reason for this slight to Lawrence; but it reflected no great credit on the corps headquarters. The honour roll of history rates Lawrence no lower on this account. Winston Churchill has written of this man that "England will never see his like again". Besides his successful organization and leadership of the Arab revolt, Lawrence was conspicuous in archæology, mechanics and literature. His "Seven Pillars of Wisdom" is regarded by Bernard Shaw as a classic of English literature.

The Price of Victory.

By this time the Turkish resistance had practically come to an end; Allenby and anophelines had administered a knock-out blow. It was now time for the British troops to pay the price of victory, exacted by malignant malaria to the last red blood corpuscle. Chaytor's force suffered 3,000 cases during the month of September; the Australian Mounted Division was immobilized in Damascus with half its strength down with malaria and pandemic influenza; the Fourth Cavalry Division struggled to Reyak and Beirut, but could go no further; the Fifth Cavalry Division, supported by armoured cars and fresh Arab tribes, succeeded in occupying Aleppo, thus slamming the backdoor on the Turks in Mesopotamia. The Armistice was signed on November 1, exactly four years after the Turkish entry into the war and the sailing of the first Australian and New Zealand Contingent from Albany, Western Australia.

Strategical Significance of the Middle East.

With Turkey defeated, and the Great War ended, did Great Britain relinquish the Levant to the mosquitoes, the Jews and the Arabs? Not a bit of it! She and France accepted mandates in Palestine and Syria, and together proceeded to consolidate their hegemony of the Eastern Mediterranean. Friendship has since been extended to the Turks, but not to the mosquitoes. With the aid of American brains and money, a great deal of health work has been done in Palestine in connexion with the Zionist movement. The Plain of Esdrælon now boasts two healthy cities at Afule and Beisan, and it has assumed a new strategic significance—it transmits a branch of the petroleum pipe line from Mosul to the Mediterranean.

Oil is one of the reasons for post-war policy in the Near East; the Suez Canal and Imperial Airways are two other motivating factors. The opening of the Suez Canal ended forever Great Britain's aloofness from the European economic system, whilst at the same time it tightened the bonds of Empire with India and the East. Compared with the Cape route, it has shortened the voyage to Hong Kong by 37%, that to Singapore by 44%, that to Bombay by 77%. There was always strategic as well as trading value in such a short cut for shipping; but since the advent of air-power our overlordship of this region has become doubly

[1] At this point Colonel Fowler gave an extemporary description of successive phases of the operations, commencing with a short appreciation of the situation on September 18, 1918, and of the relative strength of the opposing forces together with their order of battle. By utilizing a series of reference maps he was able to illustrate the topography and physical features of the country—areas of concentration, attack and pursuit, lines of communication and vital centres. Much was made of the secrecy, concealment and deception practised by General Allenby and the complete surprise sprung upon the enemy on zero day. (*Vide* captured enemy intelligence map.) Emphasis was also laid on the part played by the Royal Air Force in denying the air to enemy planes during the ten days of strategic concentration, and in bombing the enemy's main telephone exchange, with the result that communication between the Turkish armies was destroyed at a time when it was most needed. The part played by the Arab Northern Army under Colonel T. E. Lawrence was also discussed.

important. "Like a modern arterial road which is tracked for more than one variety of traffic, we have prepared the surface of our imperial highway to bear both wings and sails." The point to realize, however, is that this broad area of territory must be defended—and defended not only by men and guns, but by a safe sanitary system as well.

The Importance of Tropical Medicine.

Tropical medicine is of vital concern to Great Britain today. Nor can we in Australia remain indifferent to this matter. One-third of the Australian continent lies within tropical latitudes adjacent to huge Asiatic "reservoirs" of infectious disease. Proximity of contact is becoming ever closer by reason of aerial communication. It so happens that the direction whence comes this threat to our public health coincides with the direction of possible attack on our national security. Whilst sanitary science ranges the regions of the north, military science scouts the same localities.

Current events are showing that the Right Honourable W. M. Hughes was not quite right when he said at the Imperial Conference of 1921 that "the War and Panama have shifted the world's stage from the Mediterranean and the Atlantic to the Pacific". It is more than possible that the Second Australian Imperial Force may follow in the footsteps of the First; nevertheless, there is no question that the epidemiological situation in the Pacific Basin is at all times of the utmost concern to Australia. I shall touch later on the military significance of mosquitoes in the Pacific, but before doing so I should like to say something about the pathogenesis of malaria.

Bionomics of Malaria.

Malaria is one of the major tragedies of mankind; it is about the most widespread, the most persistent and the most destructive affliction in human experience. India has always suffered greatly at the hands of malaria, perhaps more so than any other country. Its history is said to give recognizable accounts of the disease as long ago as the year 900 B.C., whereas today malaria infects half the 350,000,000 inhabitants and kills 1,000,000 every year. For the person who is biologically minded, malaria exemplifies the inveterate and perpetual warfare that goes on between various forms of life. In the struggle for existence there is a sort of cannibalism of antagonistic species, which ordains that living things devour one another.

Malaria may be regarded as an excellent example of a somewhat complicated form of parasitism, whereby a species of unicellular organism (the malarial parasite) subsists on the blood of a mammal and reproduces its kind in the stomach of an insect. The parasitism is so specific that man is probably the only suitable mammal; the anopheline mosquito is the only suitable insect. Perpetuation of successive generations of the parasite involves a cyclical alternation of an asexual phase (in man) and a sexual phase (in mosquito). The transition from one to the other depends upon the blood-sucking propensities of the female anopheline mosquito.

The idea that the bite of an insect carrier could transmit infection was first established in 1878 by Manson in the case of the mosquito vector of filaria. This discovery was followed by others incriminating a wide range of biting insects as vectors of disease. A glance at the list given in Table I is sufficient to indicate the importance of entomology to medicine.

TABLE I.

The Discovery of Insect Vectors of Infective Disease.

Insect.	Disease.	Discoverer.
Mosquito	Filaria.	Manson, 1878.
Tick	Cattle fever.	Theobald Smith, 1889.
Mosquito	Malaria.	Ross, 1897.
Mosquito	Yellow fever.	Reed, Carrol and Lazear, 1900.
Tsetse fly	Trypanosomiasis.	Minchin with Bruce, 1903.
Flea	Bubonic plague.	Liston, 1905.
Louse, Flea	Typhus fever group.	Ricketts and others, 1909–10.

In 1915 A. E. Shipley took to heart the advice of Aristotle: "One should not be childishly contemptuous of the study of the most insignificant animal"; he gave us a delightful and instructive series of articles on the life-history and habits of fleas, bed-bugs, lice, flies, mosquitoes *et cetera*. When the articles were published in book form, the little volume was deservedly popular. But how inadequate was the title "Minor Horrors of War"! Perhaps the author meant "miniature" when he wrote "minor". In another fascinating volume, "Rats, Lice and History", Hans Zinsser attributes to these lower orders the major role in military history; the generals he considers to have been relatively unimportant. Time and time again, devastating epidemics of infectious disease have arisen as an accompaniment or an aftermath of martial operations in endemic areas. So far as malaria is concerned, the epidemiological dangers inherent in a military situation spring from two factors: the introduction into endemic areas of large numbers of unprotected individuals and the disturbance of natural conditions of mosquito breeding.

Strategy and Epidemiology in the Pacific Triangle.

As the situation in the Pacific stands today, the Panama Canal and the Singapore base are possessions of outstanding strategical importance. Neither would have been possible without the conquest of mosquito-borne disease.

In the case of Panama the truth of this assertion is evident on a comparative analysis of the data provided by the two attempts at building a canal in this region. The purposeful achievement of the Americans, after the previous failure of the French, constitutes an experience that is unique in the annals of epidemiology. In passing, it is pertinent to observe that the well-controlled experiments of the research laboratory are no more enlightening than the empirical results of large-scale human endeavour in this and similar fields, for whilst the experimentalist makes his observations upon colonies of mice, the empiricist works with communities of men.

At Panama the epidemiological conditions under which first the French and then the American attempts were made remained constant, with one exception: the Americans understood the significance of anti-mosquito measures, the French did not. *Ergo*, preventive medicine was the basis of achievement at the Panama Canal.

This conclusion is reinforced by collateral deductions. The French engineers who failed at Panama were the brilliantly successful canal builders at Suez. Why the difference? French ignorance of tropical hygiene was a constant for each enterprise; it must have been some other factor or factors that varied. At Suez, de Lesseps was fortunate; at a time when nothing was known of the parasitic cycles of infectious disease, he chanced upon a region almost devoid of endemic fevers. Engineering works in this locality disturbed nothing but barren sand; minor visitations of malaria occurred only after a sweet-water canal had been led from the Nile to Ishmailia.

At Panama deadly yellow fever and malaria were endemic. The indigenous population, "saturated" with infection for many generations, had developed a tolerance for the parasites by mutual adaptation; the herd mortality curve remained monotonously level. As soon as the balance of epidemiological factors became upset by the addition to the population of numbers of unprotected immigrants and by the disturbance of the natural terrestrial features, then the disease incidence rose abruptly and the mortality rate speeded up. The venture became a disaster; de Lesseps was ruined, and thousands of people lost their lives, all because nothing was then known concerning the cause or prevention of malaria and yellow fever.

There is much irony and little comfort in the fact that during this identical period a great Frenchman was being denounced and reviled for his effort to put medical science on the track of pathogenic microorganisms. Had Pasteur lived a generation earlier instead of being a contemporary of de Lesseps, the strategical situation in the Pacific might have been somewhat different today. Curiously enough, it was another Frenchman, Colonel Lavaran, who first discovered the malaria parasite in human blood. This

was in 1880, and the discovery was followed in 1897 by Ross's discovery of the same parasite in the stomach of a mosquito.

From then on the Americans took up the story. One of the prime causes of war between the United States of America and Spain was the threat to the United States of yellow fever, which was endemic in Cuba. As regards tropical hygiene, nothing was being done by the Spaniards in either Cuba or the Philippines. After the cession of these territories to "Uncle Sam", the Americans entered the field of tropical medicine in a big way. The discovery of the mosquito vector of yellow fever—the *Aëdes aegypti* or *Stegomyia*—was the work of Reed, Carrol and Lazear in Cuba. Lazear lost his life in martyrdom to science. Enlightened by experience in Cuba, the United States of America was able to back Goethals and Gorgas in their conquest of Panama. Meanwhile the American Sanitary Commission cleaned up the oriental Philippines.

An illuminating story of malaria prevention in Luzon is told by Victor Heiser, who was Director of Hygiene at the time. Governor-General Leonard Wood—himself a medical man—was jubilant at securing a million dollars for health purposes, and desired Heiser to spend it on draining the Manila marshes. Heiser demurred, on account of the fact that malaria was much more prevalent in the foothills than in the city of Manila. He succeeded in curbing the Governor-General's impatience and in tracing the culprit *Anopheles minimus* to its breeding place among the bamboo roots growing along the edge of hill streams. By the "dusting" of the streams with Paris-green powder, it was found that this gossamer-light and exceedingly lethal substance swirled into the marginal backwash and poisoned the larval anophelinea. Thus by the expenditure of a few hundred pounds the garrison and inhabitants of Manila were protected.

And how about Singapore base—that other strategical possession in the "ultimate arena of world history"? The transformation of that outpost into the linch-pin of Britain's defensive position in the Pacific, at a total cost of anything from fifteen to thirty million pounds sterling, began shortly after the Imperial Conference in 1921. This project, therefore, has materialized in an age when tropical medicine and hygiene have come into their own. To be told by the authorities, as you will be, that there is no malaria in Singapore should come as no surprise, even though you reflect that hitherto this spot has been one of the world's worst. Malaria is now kept at bay only by unremitting vigilance and expenditure, and occasional breaks still occur. The British in Malaya have become so health-conscious (thanks to the work of Malcolm Watson) that any small outbreak is a subject of newspaper controversy.

Clinical Considerations.

Thus far we have been preoccupied with epidemiological considerations, to the exclusion of those of a clinical nature. Both are of importance to military medicine. The point of view of the epidemiologist is collective, that of the clinician is individual. The epidemiologist thinks of malaria as a disease of the crowd, herd, colony or community; the clinician worries about the diagnosis, prognosis and treatment of a sick man. For both an ounce of prevention is worth a ton of cure.

In general, there are two methods of guarding troops against infectious disease: (i) antigenic inoculation (vaccination) to confer an artificial immunity; (ii) avoidance of exposure to the morbid agents. In the case of malaria the first method is impracticable, as no malarial antigen or immunizing process is known, the second is the only possible method, and consists in mosquito-net protection and a destructive crusade against mosquito breeding. The latter is "easier said than done", when one remembers the difficulties of mosquito-net discipline and anti-mosquito field measures.

The clinical problems in the field and at the base centre around microscopic diagnosis and the use of quinine. Mobile field laboratories are essential for military operations conducted in endemic areas, for in no other disease is early microscopic examination of the blood so important. As regards quinine, it appears that it is neither a prophylactic nor a specific cure; all that it does is to drive the parasites from the blood stream, with the result that during its administration symptoms rarely arise. This effect of quinine is the essence of its immense and irreplaceable value in military medicine. This raises the question of supply. Supplies were desperately short in our Syrian campaign; the drug has always been too expensive. The reason is the Dutch monopoly; the plantation in Buitenzorg, Java, is the source of world supply.

Preventive Medicine and the General Staff.

Should the foregoing study contain anything of value to a medical audience, it will have at least an equal appeal to officers of the general staff. Both doctors and soldiers will at once appreciate that the military importance of malaria is but one phase of a much larger subject. Preventive medicine is a powerful weapon in war, particularly in totalitarian war, and it is the duty of the medical service to keep the general staff thoroughly well informed on all such matters.

How should the general staff view the current knowledge of preventive medicine? In any particular theatre of war we might reasonably expect the High Command to ask questions such as the following: How can we expedite our capacity to reach the tactical stage? (That is, how can we develop the strategical defensive?) How can we retard the enemy's capacity to reach the tactical stage? (That is, how can we exploit the strategical offensive?) Having reached the tactical stage, how can we ensure the optimum strength for ourselves and the minimum for the enemy? The High Command might reasonably make the general observation that troops must live, manœuvre, fight, resist, pursue, and if possible, survive. The troops themselves would think of live and survive in block capitals, and would further reflect that one of the agencies designed to assist in these highly desirable objectives was the medical service.

The medical service exists for (i) the care and evacuation of the sick and wounded, (ii) the prevention of disease. Roughly, these responsibilities correspond with the tactical and the strategical use of the medical service. Preventive medicine must endeavour to facilitate the capacity of the force to reach the tactical stage by care in selecting recruits and conservation of health during concentration, movement *et cetera*. Curative medicine must consolidate tactical strength by removing ineffectives and recovering them as early as possible. So far, it will be noted, the medical mechanism is defensive.

It is possible, however, for the general staff to make use of disease offensively. For example, wittingly or unwittingly, Allenby, as has already been mentioned, exploited such means in the Palestine campaign. The Jordan Valley stalemate of 1917-1918 may be regarded as a strategical offensive, in that the Turks were pinned down to an exceedingly malarious area, with the result that their capacity to reach the tactical stage was crippled by disease.

Another stratagem for the offensive use of disease has been suggested by sensational writers as quite feasible, even if barbarous. These authors visualize the scattering of microbic agents in enemy back areas by air raid or surreptitious means.

Conclusion.

Here my sketchy thesis must end. A great many objects have been brought into the picture; many more have been omitted. Enough has been said perhaps to enable the interested student to go further by himself. He might, for example, delve into such questions as the following: (i) Did the Australian aborigines suffer from malaria? (ii) What variety or varieties of anophelines are responsible for transmitting malaria and dengue fever in northern Australia? (iii) What are the habits and breeding places of these mosquitoes? (iv) What influence will increased air transport have on epidemiology? (v) If a naval base is built at Darwin or an air base in the Gulf of Carpentaria, what epidemiological factors must be considered? (vi) With the nation at war, is there a

probability that Australian forces may operate from Singapore, tropical Australia or New Guinea? If so, what plans exist for combating tropical disease?

These and many other questions might usefully occupy the time of our hypothetical student.

Addendum: Answers to Questions.
(A.H.B.)

1. Apparently the aborigines did not suffer from malaria. Perhaps you will permit me to quote from a paper by Cilento and myself, entitled "Malaria in Australia".

It is interesting to speculate as to the existence of malaria among the natives prior to the arrival of Europeans, but the matter must remain one of speculation only. If malaria did invade the continent it left no known traces. It is probable that it did not, and since both favourable climatic factors and anophelines suitable as carriers are present, the freedom of the people must be referred to a "population" factor . . .

The aborigines were few in number and low in culture. They had no fixed abodes and they did not till the soil, but wandered from place to place over large areas of country, where, speaking generally, native game was comparatively scarce and difficult to kill or capture. Each tribe had as little contact with each other tribe as possible; residence in camps was rarely sufficiently long for the development and transfer of malaria parasites . . .

That their freedom was not the result of any immunity or partial immunity was evidenced when the aborigines abandoned their old customs and came to live with and work for the white man, for they readily contracted malaria and occasionally acted as reservoirs for the dissemination of the parasite . . .

2. The experimental work on the question of which anophelines in Australia convey malaria has not been completed. The following are incriminated, either by actual work in Australia, or because they convey the disease in immediately adjacent regions: *Anopheles barbirostris*, *Anopheles bancrofti*. It is suspected that two other anopheline mosquitoes, which convey malaria in New Guinea, are also present in Northern Australia; these are *Anopheles punctulatus* and *Anopheles punctulatus* var. *moluccensis*.

3. The military significance of dengue fever is this—that this disease may bring to a rapid termination any military undertaking for a brief period, say for three weeks. In an almost incredibly short space of time (when one considers that the disease is mosquito borne) one-half to three-quarters of the force may be prostrated for five to eight days with a rather slow convalescence. The mortality rate, however, is only about 0·1%. *Aëdes ægypti* conveys the disease in Australia; it always breeds in man-made containers, such as bottles, tins, tanks, buckets *et cetera*, and is almost invariably found in clear water.

4. The epidemiological factors that would require to be considered in connexion with the establishment of a naval base at Darwin or an air base in the Gulf of Carpentaria present some difficulty; the question embraces a consideration of all the factors concerned with the diseases met with in these areas. Nevertheless, certain broad facts stand out: (*a*) malaria may overshadow the whole picture if precautions are not taken; (*b*) blackwater fever may appear some twelve months later than the malaria; (*c*) dengue fever will almost certainly be experienced; (*d*) bacillary dysentery will also occur; (*e*) pyogenic infections of the skin and ringworm infections will be more common than in temperate climates; (*f*) occasional cases of two new venereal diseases may make their appearance—*granuloma inguinale* and *lymphogranuloma inguinale*; (*g*) endemic typhus fever exists in the area. The factors of epidemiological importance with regard to prevention are the following: (i) control of flies and mosquitoes, (ii) great care in water purification, (iii) malaria prophylaxis, (iv) personal care and cleanliness, particularly of the skin.

5. The following plans exist for combating mosquito-borne diseases in (i) tropical Australia, (ii) Papua and (iii) New Guinea.

In Darwin, as a result of vigorous measures, the situation is said to be reasonably safe. Outside Darwin the mosquitoes are practically uncontrolled. In the malarial area of Queensland, in Cape York and, of course, in rural areas, little preventive work is done.

In New Guinea, in all the district stations and at Rabaul, anti-mosquito work is excellent; but in the bush, of course, the mosquito still remains a menace.

The situation is somewhat similar in Papua, but in the absence of an adequate medical staff, perhaps the work is not quite so effective.

In tropical Western Australia some work has been done in the towns, but little outside them.

THE TREATMENT OF WOUNDED IN FORWARD AREAS.[1]

By E. W. KYLE,
Major, Australian Army Medical Corps, Abroad.

THE title which has been given to this paper makes it seem ambitious, when one considers the limited time at one's disposal. In fact I intend to deal only with those common wounds which form the bulk of the work in forward areas. Those of the more special regions would well fill the allotted time of another meeting. Possibly also the title "in a forward area" would have been better, for I have had experience of only one.

The matter which I propose to discuss is based not solely on cases which were under my personal care, but also on observations of the work of the Fourth Australian General Hospital and on my experiences while associated with the Sixth Australian General Hospital, one of whose surgeons I relieved during the latter part of the siege. The story of that hospital is an epic one, and I should be loath to trespass by intruding on it. It may possibly be interesting, however, for me to describe to you the general accommodation, conditions and methods used by the surgical side of the staff during this campaign, not with the idea of being dogmatic, but with that of representing to you the work of a team for whose methods I have the highest admiration and whose results were extremely good.

The Hospital.

The hospital, although in establishment a 600-bed general hospital, in fact functioned as a casualty clearing station, casualties and men with acute surgical conditions being retained only for such periods as were necessary to make possible their safe and comfortable transport to medical units in the rear. It was housed in a group of buildings formerly used as barracks by the Italian garrison. The area was roughly rectangular and measured approximately 200 yards by 200 yards. It was situated a few hundred yards west of the town and harbour, and was regrettably entirely surrounded by legitimate military objectives. About fourteen large rectangular stone buildings occupied this space, in a way very similar to the huts in our standing camps. In the north-western corner was a small cubicle building, which was used as a medical inspection room, and which was immediately adjacent to the surgical block. This was composed of two of these parallel buildings joined by a passageway, off which were built two sandbagged rooms used as night operating theatres.

The hospital was about eight to ten miles from the perimeter defences, and about 500 yards from the docks, from which quite a percentage of casualties came. It was connected to the perimeter by two good roads—the Derna Road and the Bardia Road. Thus, it will be seen that as far as location was concerned, the hospital was ideally situated. Nevertheless, from a surgical standpoint the time lag, which was between six and twelve hours, excepting for the closer areas, was surprisingly long and only just within good surgical limits. The reasons for this are outside the scope of this paper and are somewhat controversial, but they were obviously to be found forward of the regimental aid post. Evacuation to hospital was by the usual field ambulance, which, however, wisely interfered as little as possible with the patients.

[1] Read at a meeting of the Western Australian Branch of the British Medical Association on August 19, 1942.

The Types of Injury.

The types of injury met with were most varied; there was a high proportion of bomb wounds—that is, wounds from the fragments of high-explosive missiles such as air bombs, shells, land mines and grenades. Wounds from high-velocity small arms were a surprisingly small percentage of the total. Perhaps they were more fatal; certainly they were less spectacular, and tended to impress themselves less on one's memory.

On the whole, excepting for those with the more severe types of injury, the condition of the patients on their arrival was surprisingly good—a fact quite astonishing when one considers the considerable hardships undergone by them in the months (often many months) prior to their being wounded. I do not mean that resuscitation was unnecessary; it was necessary, but only in so far as it would be with similar injuries anywhere. What effect this preceding hardship had on the future course of the illness I am not prepared to say. It would seem certain that it would prejudice the course of repair to some extent at least.

Methods of Dealing with Casualties.

Surgical patients and battle casualties were admitted at once to one ward of the surgical block which I have described, stretchers being placed directly on iron trestles which were part of the normal equipment of the ward. This part of the building was designated "Surgical B" and was the resuscitation and classification centre. It was staffed by one of the three surgical specialists who formed the main operating team of the hospital. His duties were to resuscitate and investigate all casualties admitted and then to classify them in order of priority for operation. He was really the key man of the team, as on the smooth flow of patients to the operating table, on the accuracy of diagnosis and on the judgement of conditions depended in no small degree the success of the subsequent surgical intervention. The resuscitation itself was carried out in a corner of the ward, which was enclosed by blankets over an iron framework. It would accommodate about four patients at a time. Heat was obtained by three kerosene radiators placed when necessary underneath the stretchers. Stored blood was administered by the "Soluvac" method, an ample supply of giving sets being constantly available. The blood was collected daily from the available manpower, only group O (iv) being used. It was kept in a refrigerator and discarded after two or three days. This collection was one of the multitudinous duties of the company officer.

A few disastrous reults from the use of blood sent from the base had made the staff chary of using blood the collection of which they had been unable to supervise. I understand that these specimens had been found on examination to be heavily infected with *Bacillus subtilis* and possibly with other organisms. I understand that one of the reasons given for this was that the containers had been placed sealed in the autoclave.

During my stay I found no trouble whatsoever from transfusion. I found that about two pints were necessary in a case of any severity, and I made a practice of giving the first pint fairly rapidly and the second at the rate of about 60 to 80 drops per minute. The aim was to get the patient to the theatre in the optimal condition, preferably with the drip transfusion still running. I noticed a definite optimal point, beyond which further resuscitation failed to prevent the patient from going downhill again. It was quite difficult to judge this point. One of the most striking things I noticed while doing this work was the intense degree of shock produced on the release of a tourniquet guarding a badly crushed limb. The dramatic change in a patient's condition, following the release of a tourniquet, from a satisfactory state to one of impending dissolution, is something which impresses itself forcibly on one's mind.

I have in mind a particular patient whom I had classified as almost ready for operation. I saw him after an interval of not more than ten to twenty minutes in company with the senior surgeon, Lieutenant-Colonel C. W. B. Littlejohn, to whom I had remarked: "This one is just about right." His colour was ashen, his pulse was barely perceptible and he was obviously near death. I hastily increased the rate of blood flow and the heat, and he slowly picked up. I left him and returned in about half an hour, to find him again collapsed. He picked up again, and without much more delay went to operation—in this case amputation; subsequently he did very well. The story was this: I had for some reason or other not been keeping up that smooth flow of cases demanded by the two operators. First one had left the operating theatre to have a look for himself, and had released the tourniquet, and then the other had done the same. The two collapses had coincided with the period following each visit. It was a sharp lesson.

Serum and dried plasma had their place, but were reserved for those patients specifically needing them, even though an ample supply was available. I think their indiscriminate use shows a lack of understanding of the mechanism of surgical shock. At the risk of being tiresome, I shall endeavour briefly to remind you of the shock cycle. After injury there is a reduction in cardiac output, as a result either of nervous or chemical influence, or of both. This brings about a reflex contraction of the capillaries in the endeavour to keep up the blood pressure, the result being to force the blood into the so-called abdominal pool. Anoxæmia of the capillary walls occurs, with spoiling of the endothelial cells. Because of an osmotic action fluid escapes into the surrounding tissues, causing still further damage to the capillary walls, and so a vicious cycle is set up. The effect can be measured fairly accurately by red cell counts, or more simply by hæmoglobin estimations; in a case of severe burn I have seen a hæmoglobin estimation of 180%. Such, then is the cycle; unless this is interrupted, death of the patient occurs. It is obvious, then, in a case of pure surgical shock uncomplicated by hæmorrhage, that plasma or serum is the ideal substance to replace this internal fluid lost and to tide the patient over his dangerous period. The addition of red blood corpuscles, as in whole blood, is simply an added embarrassment to an already embarrassed circulation; it is like bringing coals to Newcastle. But the patient suffering from shock without hæmorrhage is the exception and not the rule, and when hæmorrhage is present it is obviously necessary to augment the depleted oxygen-carrying capacity of the blood—that is, to replace the corpuscles as well as the fluid. Any method which does not attempt to do this will at the best be only a temporary expedient. Theoretically, it would be necessary after the administration of whole blood to check the blood count, and if this were normal, to proceed with the transfusion of serum. Practically, it is rarely necessary, as the patient is better to go to operation to have the cause of the shock dealt with.

The X-ray room was near the exit of the ward, and patients were "staged" there on their journey to the operating theatre. In this way the minimum of movement was obtained. All foreign bodies of any size were radiologically localized by means of a special localizer, a procedure which was accomplished in a few minutes. Such were the accuracy of the apparatus and the skill of its operator—Major Tom Tyrer—that few foreign bodies (as an estimate I should say under 5%) escaped removal; the operator considered it a slur when that happened. For the sake of speed, fluoroscopic screening was usually relied upon for the determination of the extent of bony injury; a brief description of the radiological appearances was written on the field medical card by the radiologist. Transport to the operating theatre was by stretcher, the bearers being Italian prisoners, who did a prodigious amount of work apparently willingly.

The operating theatre itself was a facsimile of the ward which I have just described. Six sets of trestles accommodated the stretchers, which in most cases served as operating tables; sterilizing annexes occupied a similar position to the X-ray room. During a rush the whole staff, administrative and otherwise, assisted, leaving the services of the regular surgeons for the more severely wounded. In this way the time lag was kept down.

After operation the patients and stretchers were placed on wheels and in that way were transported to the surgical wards. To reach there they had to traverse about 50 to 80 yards of courtyard—a fact which seemed in no way to

increase our share of chest complications, which were extraordinarily few.

For subsequent treatment the patients were separated into two groups, "serious" and "not serious". The former were kept together in Ward I, which was staffed by the more highly trained orderlies. Their subsequent progress was a tribute to the adaptability of these men and to the thoroughness of their training. Since the hospital was frequently—almost constantly—under attack, it was obviously undesirable that patients should be held longer than necessary. Hence the main body of them were held only for two or three days and then evacuated by destroyer to the base. Men with wounds of the head and body cavities were in a different category. Julian Smith and others had already emphasized the disastrous results of moving these patients soon after operation; hence they were held for periods of ten days or even more, the whole skilled order of after-treatment being carried out by orderlies.

I think that covers roughly the procedure adopted, and I should now like to trespass on your time to discuss the more technical aspects of the treatment in the operating theatre.

Anæsthesia.

"Pentothal Sodium" given intravenously was the anæsthetic agent used in the majority of cases, ether being reserved for the major procedures. I consider that for this type of surgery "Pentothal" approaches the ideal, and when one considers its portability and stability the advantages are obvious. I have seen it used for periods of an hour or more with no deleterious effects. The only contra-indication appeared to be wounds of the facio-maxillary region and upper respiratory tract, the trouble being laryngeal spasm. This contraindication was subsequently the subject of an administrative instruction forbidding its use in such circumstances. Gloves were not generally used, the limited supply being reserved for patients with head and abdominal wounds.

Technique Employed in the Treatment of Common Injuries.

As I have said, I have obviously not the time to discuss in detail the treatment adopted in each case, and I have decided to confine my remarks to the technique adopted in the commoner type of injury. These, while lacking the dramatic interest of wounds of the head, chest and abdomen, form the bulk of the work, and as such are of interest to the greater number of medical men. If I am covering ground already dealt with *ad nauseam*, I must crave your pardon.

Uncomplicated wounds were dealt with by excision and general *débridement*, muscle in particular being excised until the remaining tissue was freely bleeding. But this is not sufficient. It must be realized that these wounds must be presumed to be already infected, and it is of paramount importance to provide free drainage. This is best obtained by the shaping of the wound and the free incision or even excision of the deep fascia. If this is done, the surgeon will often find an astounding amount of damage deep to what appeared to be a small and innocent hole in this membrane. Foreign bodies were always sought for—sometimes at great length—and my subsequent examination of the results of other teams led me to realize the wisdom of this procedure. The wounds were not packed, gauze well impregnated with "Vaseline" being simply laid over the surface. The limb was then encased in plaster of Paris if time permitted, which was not always so. Let me pause here to stress this point—an important one: time is not always available, and it is not justifiable to delay operation on other patients in order to put on a plaster cast at the time of operation. Again, the application of complete skin plaster casts to limbs which have not completed their swelling is not a fool-proof procedure unless careful and continuous skilled observation is available afterwards—an ideal not always attainable even in civilian surgery. Judgement is called for, and even in those cases in which complete immobilization is essential, it is advisable to split the cast and elevate the limb to allow for subsequent swelling. I can recall at least one case in which amputation became necessary for gangrene unquestionably due to pressure from a plaster cast, in spite of the fact that it had been applied by an extremely skilled and careful surgeon.

There was another reason in this hospital why plaster casts were not indiscriminately applied. It will be remembered that casualties were evacuated by destroyer, whose passage to the base was usually exciting, frequently hazardous, and sometimes incomplete. It was realized that an unnecessary plaster cast might make the difference between sinking or swimming; hence the reason for its application had to be an important one. Large vessels and nerves were frequently involved, and even when there were few physical signs of their involvement a careful search had to be made if the wound was in their locality. Often the search for the foreign body disclosed these injuries, but not always.

I did not myself attempt any routine vascular surgery; but I can recall at least one attempt to suture the popliteal artery over a glass tube, the object being to tide the limb over the hiatus before collateral circulation was established. The attempt failed, and a supracondylar amputation was performed a few days later. Neither the condition of the wound nor the place of operation was exactly conducive to success in this particular branch of surgery.

When nerve trunks were injured, it was the practice to anchor the ends in relation to one another, providing that no great loss of substance had occurred. No attempt was made formally to suture the nerve. In spite of teaching that this anchoring is harmful, it is difficult to see how a few fine sutures confined to the neurilemma can cause any great harm. If they hold, they must make the subsequent repair much easier. I should be very interested to know whether anyone present had performed secondary repair in cases in which this procedure was adopted.

Tendons were treated similarly, hopelessly damaged ones being excised. I myself made a practice of swamping the wound with flavine and then freely dusting in sulphanilamide powder. This was not a routine practice among the surgeons; but I am unable to tell you whether the wounds treated with flavine did any better than the others. It would seem that such treatment must help at least a little, but it is certainly not an essential procedure. No sutures, either deep absorbable or skin, were inserted, and when a minimal loss of tissue had occurred, it was surprising to see how small a scar was left. Secondary suture was, of course, employed later; but that is scarcely within the scope of this paper. Dressings, in accordance with modern practice, were not deliberately changed. It is obvious, however, that adjustments had to be made to slipping dressings, and the ideal was hard to attain.

A striking fact, when one considers the statistics of the last war, was the absence of severe fulminating infections. I saw only one during the whole of my stay abroad; that was a wound of the buttock, in which the shell fragment had travelled to the thigh. Proper drainage and adequate *débridement* had not been attained, and the foreign body was left *in situ*. The patient developed a gas infection and died on about the seventh day. I am convinced that it is not the use of the sulphonamides that has wrought this change, but the surgical technique employed. It must be admitted that the sulphonamides have been the protecting influence with regard to streptococcal infections; but since I have never heard of their influencing the course of an established gas gangrene infection, I am loath to agree that they prevent it. These organisms are anaerobes, and they cannot and will not grow in the presence of oxygen. Since living blood is highly charged with oxygen, it is reasonable to suppose that its presence would prevent the development of these organisms. Trueta reminds us of the classic experiment of Taylor (1915), in which a pure culture of *Bacillus welchii* was injected into a human subject with no untoward effects other than slight fever. It is the old story of the seed and the soil, and it is to the fuller realization of this that we owe our comparative immunity from these infections. Concerning the question of local and oral methods of administering the sulphonamides, I

am not prepared to give an answer. I once asked Lieutenant-Colonel C. W. B. Littlejohn, and his answer was non-committal: "A lot of people would like to know that."

Whether sulphanilamide was applied locally or not, it was our routine method to administer an initial dose of four tablets and to follow this with a dose of two tablets every four hours. Of the value of this procedure there is no doubt.

Many of these wounds involve bones, and a few words concerning the methods used to immobilize them would not be out of place. Fractures of femurs were common and presented a distinct problem. The tendency to overlap is not so great in these wounds as in the ordinary fractured femur of civil life, and that fact rendered our task easier. I would say that one of the reasons for this must be the absence of the initial telescoping violence. We were fortunate in the possession of two Hawley's tables. The limb was extended on these, the wound was treated in the usual way and then put in a plaster spica, portion of the sound limb being included in a short thigh plaster cast. I can well imagine, however, the very great difficulties that would have been present had we not had these tables. I should certainly try to improvise one if I was on duty again in a forward area.

Most of the other bones were dealt with in the ordinary way of civil practice, with the exception of the humerus. For the reasons I have before enumerated, it was advisable to avoid heavy plaster casts if possible. We found that men with fractures of the humerus travelled well to the base with a plaster slab extending from the scapula to the heads of the metacarpus and bound to the trunk by pinned swathes of triangular bandages. I have spoken to several of these, and they all said that the arm had given no trouble at all; this is a tribute, when one realizes that they travelled in the bow end of a destroyer zigzagging at thirty knots.

Amputations—usually in the presence of injury to main vessels or as the *débridement* procedure on the stump of an already amputated limb—were fairly common. Skin and subcutaneous tissue only were used as flaps, the remaining tissue and bone being divided on the same level. At the most three, and usually only two, silkworm gut sutures were inserted to steady the flaps. The stump was immobilized with Gooch type splinting, and no attempt was made to incorporate it in a plaster cast.

The classical situations were not always adhered to, since it was realized that further amputation might be necessary. I know of at least one surgeon at the base who was grateful for this decision. The true guillotine procedure was never adopted, and indeed I cannot see that it would have had any advantages. No special treatment of the bone, such as the aperiosteal procedure, was adopted, although I believe it would have been an advantage.

Wounds of joints are interesting. One is apt to fear infection in a joint, particularly the knee joint, because of the disastrous consequences of such infections. It is this that causes us to overlook the real resistance of the synovial fluid and membrane to infection. It was usual to close joint wounds even as much as twenty-four hours old without drainage, and results justified this. Wounds of the knee were quite common. Briefly, they may be classified into four groups:

1. The simple through-and-through wound, with tunnelling of the bone but no comminution, produced by a high-velocity bullet. It suffices in these cases simply to excise the edges of the wound and to immobilize the limb in a plaster cast.

2. Wounds from various types of projectile, with more or less damage to bone. These call for a greater degree of judgement, as to whether arthrotomy should be performed or not, and each case must be judged on its merits.

3. Wounds with a retained foreign body. In these arthrotomy is necessary. It will usually suffice to remove the foreign body, and after careful lavage of the joint with some bland antiseptic solution the synovia and capsule may be closed without drainage, the skin wound being best left unsutured.

4. Wounds associated with gross comminution of bone and damage to soft tissues. It is usually obvious from the start that a mobile joint cannot be expected, and it is best to treat the wound as a compound fracture with thorough excision of soft parts and removal of loose bone. In addition, if the anatomy of the joint (such as the knee joint) warrants it, adequate provision of drainage by means of tubes must be made.

I had the opportunity of following up some eight or nine casualties with such wounds operated on by various people, and the results were very good. At the hospital where they were—the 64th British General Hospital—they were being cared for by an Australian, A. C. Armstrong, who is probably known to those of you who have done post-graduate work at Liverpool. I spent a happy and instructive month under his tutelage.

Immobilization.

Let me say a word here regarding immobilization. I saw much evidence of inadequate immobilization abroad. The golden rule of "a joint above and below" has few if any exceptions. One is only half doing the job if one attempts to immobilize a knee with anything less than a hip spica; similarly a shoulder spica is essential to immobilize an elbow. The results obtained in wounds of joints will more than justify the time and trouble taken. Nor do I think that the ultimate degree of stiffness is aggravated by such immobilization. The adequate localization of infection and resultant adhesions will more than compensate for any disuse of muscles. It is obvious that in regard to these wounds the primary treatment is more important than perhaps in regard to any other—it may well decide the loss or saving of a limb; it will certainly decide its future function.

First-Aid Treatment in the Line.

Let me conclude by discussing briefly the first-aid treatment of the casualties in the line. I know nothing first hand of the difficulties and can speak only from the viewpoint of the man receiving the casualties at the operating centre. I do think, however, that this viewpoint may be useful to the medical personnel further forward. The main complaints I have heard of were the following:

1. Inadequate dosage of morphine. Now, a quarter of a grain of morphine given to a strong healthy male is, I think, valueless; half a grain should be regarded as almost minimal in such cases. Even with this dose I have had wounded men say they did not experience much relief. I should be interested to hear any comments on the value of morphine given intravenously. One must regard the relief of pain as a *sine qua non* in the treatment of shock.

2. Inadequate immobilization. This is intimately bound up with the first complaint. One of the best adjuncts to a sedative is the immobilization of the injured part. One can imagine the difficulties in an ill-lit regimental aid post; but I do think that more stress should be laid on immobilization. One of the reasons, I think, is the still archaic contents of the panniers. It is difficult to think beyond Kramer wire and skeleton splints of the Thomas type when one is considering this type of first aid; in addition, the splinting power of adjacent parts of the body was overlooked. Both the types of splint mentioned are produced in Australia.

3. Bad bandaging. Whether this is due to the type of dressing or not I do not know. It is a fact, however, that rarely had the dressing remained at the site of the wound. I think a well-applied dressing has many advantages, not the least of which is its psychological influence. Its use as a hæmostatic is obvious, and it must surely limit the infection to that which has entered prior to its application.

Transport Considerations.

Lastly, let me make a plea for the rapid removal of patients to a place where there are facilities for adequate surgical attention. Patients should not as a routine measure be removed from ambulances at main dressing stations. Only a small proportion need resuscitation methods at such posts; the others should be dispatched

after examination without further treatment to the nearest surgical post. Obvious though this may seem, it is still not emphasized in field ambulances. One realizes the necessity for a stop when distances to such posts are very great; but let us hope that such conditions will become increasingly rare.

Conclusion.

I make no apology for these criticisms. They are but the views of an individual and will doubtless carry only the weight of that individual. If, however, I have stimulated your thoughts towards improving our service to the wounded, I shall have achieved my object.

THE PHYSICAL SIGNS OF A PLEURAL COLLECTION, WITH PARTICULAR REGARD TO A NEW SIGN FOR ITS DETECTION.

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THE detection of fluid in the pleural cavity is not so easy as is indicated in the text-books. Cases occur in practice, in which its differentiation from other processes involving the chest becomes a hard task. Of the many signs suggested in the text-books, some have lost the importance they once enjoyed. Students hear of them only in passing; seldom do they see them demonstrated. Without belittling the importance of X-ray examination and explorative puncture, I believe that the diagnosis of fluid in the pleura should be made on physical signs and then confirmed by other means.

The habit of a thorough examination of the chest, according to the never-too-much-praised routine of inspection, palpation (both generally neglected as not giving results worth consideration), percussion and auscultation, cannot be sufficiently emphasized. Students, and sometimes young medical graduates, consider it a loss of prestige in the presence of the nursing staff or the patient's relatives if they spend some extra time in a careful examination of the patient, and the results are sometimes disappointing. A small empyema in a child may cause no changes in the sounds; but a careful inspection may still reveal a bulging of the affected side, and palpation may reveal an increase of the resistance and a reduction of the respiratory excursions compared with the sound hemithorax. I shall try first to review the signs of collections of fluid in the pleura.

Inspection.

In every case of a conspicuous collection of fluid, the impaired side, especially at its base, appears dilated, barrel-shaped; the intercostal spaces are flattened or bulging; the spine may be slightly bent towards the sound side. There may be a lagging or complete immobility of the diseased hemithorax, which is due to the reduction of the diaphragmatic mobility and the collapse of the lung.[1]

Litten's diaphragm sign cannot be detected with the increase of fluid; the heart and mediastinum are displaced. The apex may be found in the left axilla if the fluid is in the right pleura, or in the epigastrium or even further to the right if the fluid is in the left pleura. Occasionally in these cases a pulsation synchronous with the heart beats, but outside the cardiac area, may be seen (pulsating pleurisy). Measurements of both sides made with a measuring tape from the spine to the middle of the sternum are useful in confirming variations of size and in following the gradual absorption of the fluid. (Normally the right hemithorax is one-half or three-quarters of an inch larger than the left one.)

[1] The lagging observed in the first stage of exudative pleurisy or dry pleurisy, when pain is a prominent symptom, is caused by a reflex inhibition, which induces any inflamed, painful organ to rest.

Palpation.

Palpation confirms some of the findings of inspection, especially the lagging of the impaired side; a great increase of the resistance to compression may be felt. Occasionally fluctuation is detected, especially in the presence of an empyema which is breaking outside. Frictions can be palpated in the first or third stage of pleurisy, better on the latero-inferior aspects of the chest, less easily on the apices. The vocal fremitus disappears; but when the collection of fluid is small or the patient is thin, it may be only diminished, so that reliance should be placed on the results of comparison with the other side rather than on the absolute finding. If fremitus is absent from a dull area while it can be palpated on another spot, adhesions with the lung should be inferred.

Percussion.

In regard to percussion, two facts should be borne in mind: firstly, that quantities of fluid less than 120 cubic centimetres (about four ounces) in children and 400 cubic centimetres (about fourteen ounces) in adults cannot be detected by percussion; secondly, that elastic chests can transmit vibrations in spite of the fluid layer between the lung and the percussing finger. The muscular development and the thickness of the subcutaneous fat should be considered, and the thinner the chest wall, the lighter the percussion should be. Strong percussion is the main reason for failure in detecting small collections of fluid in infants. The behaviour of the area of dulness is characteristic; starting with a strip on the postero-lateral aspect at the beginning of the exudation phase, it increases with the increase of fluid, forming the so-called Ellis-Damoiseau's line—that is, a parabolic curve whose apex reaches the shoulder or the armpit. Percussion in the right armpit is most useful in distinguishing dulness belonging to the pleura from subdiaphragmatic dulness due to a subphrenic collection, or to an enlarged or pushed-up liver; in this case the line is completely different, being horizontal or slanting backwards from the mammary to the scapular line. The displacement of the fluid with the respiratory movements is limited and displacement with the change of position is proportionate to the nature of the fluid—the thicker this is, the easier the formation of adhesions and the less the displacement. Garland has described an area of clear tympanitic resonance between the spine and the area of dulness ascending towards the armpit; for obvious reasons, the larger the collection of fluid, the smaller the so-called Garland's triangle. On the paravertebral region of the sound side, when the fluid reaches at least the eighth rib, an area of dulness may be detected. It was first described by Koranyi in 1887, and was later studied by Grocco and by Rauchfuss and named after the last-mentioned workers. It is triangular in shape; its base corresponds to the lower pulmonary margin, and one side is a few centimetres lower than the area of dulness, the hypotenuse being easily found by connecting the ends of the two sides. There is no agreement on the cause of this dulness; according to some it is due to the displacement of the mediastinum with an increase of the paravertebral recess, and according to others it is due to the hydrostatic pressure of the fluid on the spine, whose vibrations are dulled. Probably the phenomenon is brought about by both factors. Many of these signs lose most of their importance in cases of capsulated collections, in which case the area of dulness may assume queer shapes, the diagnostic difficulties being greatly increased. Another sign revealed by percussion is the Skodaic resonance (named after Skoda, who studied it first). This is a frank hyperresonant or tympanitic sound detected just above the fluid level, heard best in the subclavicular fossa. The sign is present also on the upper portion of a lung whose lower segment is affected by pneumonic consolidation. It is explained by the fact that the lung tissue above the pressure becomes relaxed, and the action of the septa which subdivide the air columns is abolished, so that suitable conditions for the production of tympanism are set up.

In the early stages of fluid formation in the left costo-diaphragmatic sinus, light percussion may reveal a band of dulness between the area of clear lung resonance and the area of gastric tympanism. With the increase of fluid the whole of Traube's area disappears.

Auscultation.

A progressive weakening up to a complete disappearance of the normal breathing below the level of the fluid is the rule. In regard to auscultation also the importance of comparative examination is emphasized, especially in the case of children, in whom, owing to the greater conductivity of the chest, the breath sounds may be preserved or slightly reduced. Just above the fluid level, for reasons already explained in connexion with percussion, bronchial breathing is heard; this may be found all over the area, occasionally in the case of a very copious exudate. Auscultation of the voice may reveal alterations in the quality of the vocal resonance. Bronchophonia is a reinforcement of the vocal resonance, as if this were produced near the earpiece of the stethoscope; it is heard just above the fluid level. Sometimes when the lung is separated from the chest by a thin layer of fluid the voice may assume a bleating character; the phenomenon is called "ægophony", from the Greek word for "goat".

Paradoxical Dulness Over the Spine.

A new sign, with which we are particularly concerned, was suggested in 1938 by Professor L. D'Amato, of the University of Naples. It is based on the observation of the following paradoxical finding. When the fluid is formed or collected in the pleural cavity, percussion on the spine with the patient sitting up in bed reveals an area of dulness whose height is proportionate to the amount of fluid. If the patient is now asked to lie down on his sound side, one would expect an increase of dulness on the spine; but the opposite happens, as the area of dulness is reduced by one, two or three inches. This paradox has been given the following explanation by D'Amato and his school: if the area of cardiac dulness is marked with a skin pencil when the patient is in the erect posture and when he is lying on his side, it will be found that in the latter position it is increased. Radiological studies have confirmed that the area is reduced because the fluid, instead of flowing backwards, fills the pleuro-pericardial sinus. The sign is easily detected; careful percussion of the spine is required, rather strong percussion, considering that bony resonance is in question. A mark is made on the upper level of the area of dulness, or a finger is kept on it. The patient is now asked to recline on the unaffected side, and ten to fifteen seconds are allowed to elapse; then, when the same place is percussed, a clear sound is produced, and a lower level of dulness can be marked. The finding can be checked by reexamination of the patient in the erect posture, in which case the area of dulness will reach the same level as before. I have been looking for this sign among the patients at the Wangaratta Base Hospital suffering from chest lesions, and I found it in all cases in which the clinical and other physical signs, together with the results of exploration or X-ray examination, revealed the presence of fluid, no matter what its nature or origin. As to the clinical value of the sign, it can be safely said, without its importance being exaggerated, that it may be considered as reliable as other percussion signs. Dulness on the spine should induce the physician to suspect fluid in the pleura, though other chest or mediastinal conditions can cause a change of the resonance on the spine; but in these cases it is a fixed area of dulness, which does not change with the change of the patient's position. On the other hand, absence of dulness over the spine can be relied upon to rule out the possibility of fluid in the pleural cavity. The area of paradoxical dulness may be absent if strong adhesions have formed. The following case is illustrative:

A lad, aged fifteen years, had a doubtful chest condition, the diagnosis resting between a pleural collection and unresolved pneumonia. Percussion over the spine revealed a fixed area of dulness. Repeated explorations of the chest gave negative results. The chest had to be explored again on account of elevation of temperature due to sepsis; only about 20 cubic centimetres of pus were aspirated.

The operation revealed a beehive-like empyema, with thick, tenacious adhesions accounting for the absence of the paradoxical area of dulness over the spine.

D'Amato has suggested that the increase in the dulness of the cardiac area may be considered a sign of the presence of fluid. It is a rather difficult sign, requiring considerable practice in heart percussion; therefore it is doubtful whether for practical purposes it can be exploited so well as the paradoxical area of dulness over the spine.

Reviews.

HANDBOOK OF PRACTICAL BACTERIOLOGY.

THERE should not be many laboratory workers in British communities who are not familiar with Mackie and McCartney's "Handbook of Practical Bacteriology", a book designed primarily to define the best technical methods for the discharge of the routine work of public health and hospital laboratories.[1] The book first appeared in 1925 as "An Introduction to Practical Bacteriology" and reached its fourth edition as a hardy triennial in 1934. In the fifth edition (1938) the book had expanded to such a degree that it was more appropriately styled a "Handbook of Practical Bacteriology". Amplification rendered necessary by the march of events in bacteriological research has resulted in an increase of 53 pages for the sixth edition, which has now surmounted the difficulties in publication contingent upon a state of war.

Like *"Omnia Gallia"*, as described by Cæsar, the most recent edition of Mackie and McCartney's book is divided into three parts, an arrangement which it might be said to have inherited from its precursors. The kernel of the book, which the authors present as essentially a practical manual, is in Part II, although much valuable information is compressed into Parts I and III. An interesting appendix treats of the mechanism of the bacteriostatic action of the sulphonamide compounds, the addition of *p*-aminobenzoic acid to media for the cultivation of susceptible bacteria from patients under treatment by these drugs, the preparation of certain highly specialized media for the growth of specific microorganisms, and improvements in technique for the bacteriological examination of air.

In Part II particularly the atmosphere is that of the busy work-a-day laboratory, an impression of activity and efficiency being conveyed by the terse directions and incisive sentences. The book is concisely practical and for its size remarkably comprehensive. Of illustrations there are few and of frills there is none, but not many problems in laboratory technique can have been omitted from the work.

A brief outline is given of the system of classification and nomenclature introduced some years ago by the Society of American Bacteriologists, but the authors have adhered to the older terminology with equivalents in the new indicated in brackets. This would seem to suggest a lack of enthusiasm for the advanced nomenclature on the part of Mackie and McCartney; if so, we find ourselves in sympathy with them, although we can proffer no better reason for our conservatism than that old friends of Petrie plate and test tube seem somewhat estranged in their new guises. It is difficult to accept the cumbersome term *Mycobacterium tuberculosis* as everyday currency for the denomination of the tubercle bacillus and a long time will probably elapse before *Corynebacterium diphtheriæ* displaces Klebs-Löffler bacillus from the vocabulary of the laboratory.

This book, if given its due, will be accorded a prominent place on the laboratory bookshelf, where, readily accessible and always to hand, it will prove itself an ever-present help in time of trouble.

[1] "Handbook of Practical Bacteriology: A Guide to Bacteriological Laboratory Work", by T. J. Mackie, M.D., D.P.H., and J. E. McCartney, M.D., D.Sc.; Sixth Edition; 1942. Edinburgh: E. and S. Livingstone. Crown 8vo, pp. 488, with illustrations. Price: 17s. 6d. net.

The Medical Journal of Australia

SATURDAY, NOVEMBER 21, 1942.

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RECONSTRUCTION IN THE PRACTICE OF MEDICINE.

THAT the war will bring about great changes in the life of the community is widely recognized and the members of the medical profession know that these changes will have an effect, probably a profound effect, on the practice of medicine. If there are some who deny the truth of this statement they are probably to be included among those who do not see something staring them in the face because they close their eyes to it. The only way to deal with these people is to treat them in the same way as they treat the problems facing them. Medicine today needs clear vision and freedom from irritating obstruction. In our recent discussion of the meeting of the Federal Council held at Melbourne a few weeks ago, the attitude of the Council was made clear and we cannot imagine that any medical practitioner will question the wisdom of a policy which aims at investigation of different methods, ways and means, so that members of the British Medical Association in Australia may be well informed and able at any future date to show that opinions expressed by them have been formed after careful study of the whole subject. The logical extension of this attitude is that members of the Branches should be made acquainted with any important contributions to medical literature which have a direct or indirect bearing on the subject of reconstruction. A striking discussion on reconstruction in the practice of medicine has come from Sir Farquhar Buzzard, Regius Professor of Medicine in the University of Oxford.[1]

Sir Farquhar Buzzard's views are the more noteworthy since they were advanced in the Harveian Oration for 1941 before the Royal College of Physicians of London. He states at the outset of his oration that there is but one answer to the question as to whether we admit the need for change in the practice of medicine. He speaks as one who has been studying and practising medicine for half a century, and he holds that others in the same category will be as ready to admit or even to assert this need as the student or lately qualified practitioner of today. There is, he holds, general agreement that the profession, as at present organized, is not giving to the public the best service of which it is capable. He makes this statement subject to the proviso that there may be some differences of opinion in regard to the origin and nature of its shortcomings. Although the practice of medicine is of great antiquity, it has by no means attained its full stature; as Buzzard puts it, medicine is engaged in a struggle for scientific status, it is but a child and stands in need of guidance and education. This being so, it should be possible to make of it an instrument which will satisfy the needs of the community. At this juncture Buzzard makes an observation often mentioned in these columns, but usually forgotten by impetuous reformers—"the practice of medicine is only one of many social services the evolution of which is being materially affected by rapid changes in the classic and economic fabric of our time and country". There are too many people who believe that if the practice of medicine is transformed and its practitioners are enrolled as civil servants in some kind of health insurance scheme or as officers on a full-time salaried basis, a kind of health millennium will have arrived. Nothing, of course, is further from the truth, for it is no use to provide people with a cheap or a free medical service to cure them of their sickness if they are allowed to live and move and have their being in squalid homes in congested areas and under unsavoury conditions, any and all of which, acting alone, may produce illness. Buzzard states that "medical isolationism is neither possible nor desirable". This is perfectly true, but it rather suggests that the isolationism has its origin and finds its adherents within medicine's own ranks. This is not a fact. It is, at least in this country, chiefly in the world of politics that reform of medical practice is looked on as a panacea for ill health.

In discussing remedial medicine, Buzzard first of all mentions the growth of the ancillary services and their importance as aids to diagnosis and treatment; he then shows that the chief difficulty in medical practice of today is lack of time. "Any medical service which aims at the prevention and early detection of disease, to say nothing of the preservation of health, must provide the doctor with ample time to carry out his work, and . . . the better educated the doctor the more time he will require. The chief flaw in a badly organized service, such as that which has evolved in this country during the last century, is lack of time, and both the general practitioner and the consultant, in order to earn a living wage, are frequently obliged to undertake far more work than they can deal with efficiently in the hours at their disposal." Buzzard applies this statement to institutions as well as to individuals. Every word that he writes about long lists of patients waiting for admission to hospital as an indictment of the system is as true of Australia as it is of the Old Country. How long, he asks, will the public tolerate this kind of thing? How long indeed? Most Australian practitioners will also agree with what Buzzard has to say about the growth of hospital practice, about the economic grounds for its continuance and about its value to the public "even if, for a time, they cease to be under the direct control of their own doctors". It would be interesting on the other hand to know what Australian

[1] *The Lancet*, March 21, 1942.

practitioners thought of his views regarding doctors' incomes derived from attendance on a fee-per-visit basis, for it is a crucial point. That so many practitioners depend for a great part of their income on patients whom they attend on this basis presents, Buzzard maintains, a very difficult problem. He writes: "While this principle, so easily open to abuse, has been carried out in general with great fairness and honesty it remains fundamentally wrong in that it discourages that intimate relationship between patient and doctor whereby the latter should be the guardian of the former's health. It is impossible to argue that such a system is anything but an obstacle in the path of public health and of preventive medicine." In other words private practice as we know it in Australia is fundamentally wrong. There is no doubt that Buzzard throws down the gauntlet; there is no doubt also that there will be some anxious to take it up, though other will agree with him. This is one of the chief issues about which Australian practitioners have to make up their minds. Should they agree with Buzzard they will then have to go further, as he does. He points out that it is easier to expose the evils of practice based on the fee-for-visit system and to show how the national health insurance scheme has so far failed to overcome them than it is to suggest an improvement. In spite of this he thinks it difficult to avoid the conviction that in some form of "comprehensive, well-organized and perhaps compulsory insurance" a solution may be found.

So far we have followed our author in his discussions on remedial medicine; what he has to say about preventive medicine is equally cogent. He describes it as a child of the State which also exhibits precocities of growth and promise for further development. Its practitioners have accomplished much; they have reached the outer defences of the home, but no further progress can be made unless the cooperation of the general practitioner within the home is enlisted. "At the present time we have on the one hand the great bulk of the profession subsidized to combat established ill health without the modern equipment necessary for the purpose, and, on the other hand, a smaller number of whole-time officers paid to preserve the health of the community but without the personal and domiciliary contacts essential for the success of their tasks." This schism of interests will persist unless the faults are corrected at their source. Buzzard sees three basic defects. The first is that a man who goes into panel practice has received little instruction in the subjects of the preservation of health and the prevention of disease, his attention having been directed almost entirely to the diagnosis and treatment of disease and mainly of established disease rather than of early and slight departures from health. The second defect is that under the prevailing organization the panel practitioner has not the time nor the facilities to devote to his chief objectives. The third defect is that the whole subject of social medicine has been and is being neglected in Great Britain. It will be noted that these defects as stated refer to insurance panel practice which is unknown in Australia. We therefore have to ask ourselves first of all whether they apply to medicine as practised in this country at present, and secondly, whether they might arise if a half-baked insurance scheme were introduced here. Even if it was concluded that the defects described do not and would not apply to Australia, it is interesting to note that Buzzard suggests principles which should govern the process of their eradication. He thinks that there are three main branches of professional activity each of which should work in close accord with others. These three branches are: (*a*) environmental hygiene and preventive medicine; (*b*) personal hygiene, including preservation of health, the early detection and diagnosis of ill health and the care of patients suffering from the lesser and more chronic disabilities; (*c*) curative medicine, teaching and research. To these three he would add social medicine. Most of those who think about this subject will agree that these four branches should be closely associated, regardless of the type of framework on which medical practice of the future is built.

In actual reconstruction Buzzard pays much attention to the education of the student. He insists that there should be between universities and schools some agreed scheme of preparation for the learned professions, and he discusses preclinical education, the period of clinical education and a period of apprenticeship after a basic qualification has been obtained. He then refers to the need for some readjustments of long-standing conceptions and conventions. He states three assumptions:

(*a*) that the preservation of health and the prevention of disability in a community are the highest aims of a medical service whether looked at from the humane or the economic point of view;

(*b*) that the State, in its response to the demand for social services, will not only make increasing provision for the fulfilment of these aims, but will acknowledge the claim of every member of the community when disabled, whatever his means, to the best that the medical profession can offer for his restoration to health;

(*c*) that in cases of serious disability skilled diagnosis and treatment must pass more and more into the hands of specialists and hospitals.

Having stated these assumptions, Buzzard considers the effect on general practice of a plan of education such as he describes and of the three assumptions. He thinks that the general practitioner would be better equipped to perform his primary duties, that he would be able to find more interest in prevention and that he would be able to contribute to the advance of social medicine. In order to secure for the practitioner a career as attractive as that envisaged by Buzzard certain conditions are held by him to be essential. The problem of adequate time for the efficient discharge of duties would need to be solved by the limitations of clientele; the practitioner should no longer gain his livelihood by looking to patients for whom he is paid per visit; adequate provision of hospital accommodation should be available and specialists should be within reach; possibly essential offices and other services might be shared with other practitioners. Beyond these essentials and of far greater importance in Buzzard's eyes is the need to educate patients in the importance and progress of preventive medicine. In conclusion, Buzzard makes some remarks on regional organization, suggesting that a large body of professional opinion which looks askance at a State medical service, might not be unwilling to accept a federal union of regional health services looking for general guidance and support from the State.

The views expressed by this well-known medical writer and thinker are commended to the careful and critical attention of Australian practitioners; they comprise ideas which should be helpful to anyone giving thought to the future stability and effectiveness of medical practice.

Current Comment.

CYSTIC DISEASE OF THE LUNG.

THE condition known as cystic disease of the lung is generally regarded as congenital. It is believed that during the development of the lung a small bud is in some way pinched off. It continues to grow, becoming a more or less spherical structure, lined with columnar epithelium and containing irregularly arranged smooth muscle, elastic tissue and cartilage in its wall. Its contents consist of mucus. The appearances are suggestive of a bronchial origin. The cyst may eventually discharge into a bronchus, when it fills with air. Another theory is that the cysts form as a result of arrested development of the pulmonary parenchyma; the bronchi continue to grow, forming abnormally large spaces; when air is introduced at birth, these spaces become ballooned out into cyst-like structures. There may be one cyst only, or there may be many; and their size is variable; a large cyst may occupy practically the whole of one lung. Until recently the disease has been regarded as rare. But investigations of the past few years show that this view needs revision. The more extensive application of radiography has been responsible for considerable increases in our knowledge of this disease. The literature has been reviewed recently and a case simulating cystic disease has been reported by W. Raney Stanford and Brodie C. Nalle, junior.[1] They first draw attention to the difficulty of differentiating between "congenital cystic disease of the lungs, acquired cystic disease of the lungs, and extensive emphysema with bullous formation". They stress the importance of accurate diagnosis, because "some types of cystic disease of the lungs are amenable to surgical procedure". Their patient was a male Negro, aged thirty-four years, who complained of shortness of breath, indigestion, and great loss of weight. He had been a footballer and long-distance runner when he was at college, and his symptoms were of four years' duration only. He was emaciated and breathless. The veins of his arms were slightly engorged. The excursion of the diaphragm on inspiration was slight; the note on percussion of the thorax was high-pitched; the breath sounds were scarcely audible. The vital capacity of the lungs was 1·16 litres, "30·4 per cent. normal". X-ray examination showed annular translucent areas in both lung fields, and numerous opaque band-like areas that might have been due to fibrosis or to atelectasis; the diaphragm was low and had little motility. An attempt was made to induce artificial pneumothorax on the right side, for diagnostic purposes, about 150 cubic centimetres of air being introduced. But a spontaneous pneumothorax occurred on the same side, and dyspnœa increased. Continuous suction of air from the right hemithorax was employed; but the patient died in a few days. Post-mortem examination revealed numerous cyst-like sacs, containing air, in the substance and on the surface of each lung. They measured from seven millimetres to seven centimetres in diameter. On the surface, these "sacs covered the lung periphery in grape-like clusters and were formed by a thin, transparent, pleura-like membrane which contained blood vessels". They did not collapse when a probe was passed into them. No consolidation or congestion was apparent to the naked eye in the remaining lung tissue. But microscopic examination revealed atelectatic areas. No bronchial epithelium was noted in the cyst walls. The lining of the cysts was anthracotic. This latter finding is of some importance, as staining with dust is supposed not to occur in the congenital type of cystic disease. But, as Stanford and Nalle point out, in their case the cysts were all in communication with bronchi and would therefore be liable to invasion by the various dust particles that vitiate a city's atmosphere.

After a study of the history and the post-mortem findings, Douglas H. Sprunt expressed the opinion that the condition was one of "acquired pulmonary emphysema".

Stanford and Nalle point out that the first comprehensive report of cystic disease of the lungs was made by Koontz, in 1925. Koontz found records of 108 cases in the literature. In 1937, Schenck found that 381 cases had been reported; he had seen five cases himself.

Stanford and Nalle state that once a cyst has ruptured into a bronchus it may prove to be either expansile or non-expansile. If the opening is such as will allow air into the cyst, but will not allow it to escape, the cyst increases in size; if the opening is small, but allows air to pass slowly in and out the cyst remains stationary; if the opening is free "the cyst usually cures itself". Expansile cysts may stretch to an enormous size and may rupture into the pleural cavity. It would seem to us that any explanation of these huge cysts on purely mechanical grounds is difficult to accept. Let it be assumed that a stop valve is formed at the opening of the cyst into a bronchus. The pressure in the cyst will increase as more and more air flows into it; but is that pressure limited by the pressure in the bronchus or does it remain negative by reason of the pull of the surrounding lung parenchyma? If the pressure in the cyst is equal to the pressure in the bronchus, then no air can pass from the bronchus to the cyst; but if it is possible for the pressure in the cyst to remain negative, or having increased to diminish again, then air will continue to enter and the cyst will continue to swell. These are matters that the glib writers on "pressure" cysts and "pressure" pneumothoraces seldom attempt to clarify. It is not enough merely to say that as air can enter and then cannot get out it must continue to flow in and so increase the volume of the cavity that it has invaded. "Cystic disease of the lungs may cover the whole span of life, extending from premature still-birth to very old age." If no complications arise a patient may remain free of symptoms for many years. There are no characteristic symptoms; but authorities agree that recurring paroxysms of dyspnœa and cyanosis in infants and children should be sufficient for a consideration of cystic disease in the diagnosis. Such symptoms may be caused by a sudden increase in pressure in a "balloon cyst". In some cases there is a history of the expectoration of "milky or albuminous fluid". But the diagnosis is almost entirely dependent on radiography. In this, either artificial pneumothorax or the instillation of lipiodol into the bronchial tree may be of assistance. The introduction of air into the pleural cavity separates the cyst wall from the parietes and so differentiates the condition from localized pneumothorax. However, it would seem that this procedure is not devoid of danger to a patient who already has little enough functioning lung tissue. The instillation of lipiodol in many cases produces a beautiful radiological picture that is quite unmistakable. This, in our opinion, should be the procedure of choice. Fluid-containing cysts have to be differentiated from pulmonary abscess, teratoma, neoplasm, hydatid cyst, empyema, chondroma, ganglioneuroma *et cetera*.

It is said that the mortality rate in this disease is high in infancy and childhood. Infection is a grave complication. On the other hand, it has been noted by numerous observers that the disease may exist for many years without causing symptoms. It would seem therefore that no accurate estimate of the mortality rate is possible in the present state of our knowledge; many symptomless examples of the disease must pass unrecognized.

Treatment is unsatisfactory. If the cyst is large and is causing respiratory embarrassment, it may be tapped; but this procedure may cause dangerous shock. Extirpation of the cysts has been performed. Other measures are cauterization of the fistula between cyst and bronchus, the injection of the cyst with silver nitrate solution and the production of bronchial stenosis by the application of 35% silver nitrate solution to the mucosa. Medical treatment is symptomatic only.

Stanford and Nalle seem to have some doubt whether their case should be regarded as one of congenital or acquired cystic disease. If it was acquired, why was it acquired? Surely there must have been some inherent defect to make the development of these cysts possible. It seems that the qualification "congenital" is justifiable even if the cysts are not actually apparent at birth.

[1] *Annals of Internal Medicine*, July, 1942.

Abstracts from Medical Literature.

PHYSIOLOGY.

Arterial and Cerebral Venous Blood.

E. GIBBS, W. LENNOX, L. NIMS AND F. GIBBS (*Journal of Biological Chemistry*, July, 1942) have determined the concentration of oxygen, carbon dioxide, hydrogen ion, lactic acid, sugar, and total base and inorganic phosphorus in the arterial and internal jugular venous blood of 50 intelligent, healthy, electro-encephalographically normal, young men. Blood samples from an artery and internal jugular vein were drawn simultaneously, thus permitting estimation of the metabolic activity of the brain. These data furnish normal control data for future studies of the metabolism of brains which are functioning abnormally. The respiratory quotient of the brain in this series is 0·99. This figure, together with the data on the concentrations of sugar, lactic acid and oxygen in the blood entering and leaving the brain, indicates that sugar is the principal source of energy for the brain in vivo. However, not all of the sugar is completely oxidized, for a small part appears to be converted into lactic acid.

Clotting Factors.

H. B. STEIN (*South African Journal of Medical Science*, February, 1942) has examined the effect of 2-methyl-1, 4-naphthoquinone (vitamin *K*) on the clotting factors of the blood in 23 patients with hypothrombinæmia. The effect on other tests supposed to indicate hæmorrhagic tendency has also been examined. The plasma prothrombin may respond in one of four ways. An effective response (prompt or delayed) is associated with patients having obstructive jaundice. An ineffective response (partial or complete) is found in hepato-cellular jaundice. The nature of the response is therefore of diagnostic value. The plasma fibrinogen and serum calcium are unaffected by the naphthoquinone and do not reflect the hæmorrhagic tendency as does the prothrombin. The sedimentation rate is also unaffected by the injection of naphthoquinone. The degree of clot retraction and dry bleeding time may, but do not necessarily, reflect the amount of prothrombin before and after the injection of naphthoquinone. The above findings are discussed in relation to the work of other investigators. An explanation is offered of the role of the liver in the metabolism of vitamin *K* and in the production of prothrombin.

Enzymes and Insulin.

R. BANNER, S. DERENIUK AND L. THOMAS (*Endocrinology*, August, 1942) report on the action of certain enzymes on insulin. Insulin was incubated with pancreatin and with activated papaine for periods too short to destroy all of its capacity for lowering the blood sugar content, and the digest was filtered through an acetic acid collodion ultrafiltration membrane of known porosity, which was not permeable to insulin. The filtrate was found to have no effect on the blood sugar content. Insulin was incubated with macerated pancreatic islet tissue from a fish known as sculpin, and the mixture ultra-filtered in the same way. The filtrate was without any effect on the blood sugar content. Insulin was incubated with macerated fœtal calf pancreatic tissue and the mixture filtered through a cellophane membrane of known porosity, which was impermeable to insulin. The filtrate was found to have no effect on the blood sugar content. These results cast further doubt on the existence of a fraction of the insulin molecule which is capable of lowering blood sugar by itself.

Pulmonary Cerebral Effect Time.

M. H. UHLEY (*The Journal of Laboratory and Clinical Medicine*, June, 1942) describes a method of measuring pulmonary cerebral effect time by the use of amyl nitrite. The amyl nitrite perle is placed in a small metal case and broken by a plunger. With the inlet hole covered by a finger the case is applied to a nostril. The subject removes the finger from the hole, at the same time inhaling deeply. The observer measures the time between inhalation and the appearance of any effect as signalled by the subject. Results obtained in one hundred normal subjects are given. The time varied from six to eighteen seconds, the most common time being twelve seconds. The author states that the spread obtained is no greater than with other methods currently in use. The pulmonary cerebral effect time is a measure of the effective pulmonary ventilation, the circulation time of the left side of the heart and the reaction time of the subject. Its use in determining the degree of failure of circulation of the left side of the heart is thus limited to instances in which no disease of the pulmonary apparatus exists and in which the reaction time of the subject is not abnormal. Conversely, it may offer an index of the degree of diffuse chronic pulmonary disease in the absence of cardiac disease. When abnormalities are present in both pulmonary and vascular systems, the combined effects may be measured, but without evaluation of the component parts.

The Changes in Blood Volume Produced by Diabetic Acidosis.

S. D. JACOBSON AND R. H. LYONS (*The Journal of Laboratory and Clinical Medicine*, June, 1942) describe the effects of diabetic acidosis on the blood volume of two subjects. The subjects were observed without insulin for one to two weeks on a 4,000 Calorie diet. In one subject there was a loss of 1·5 kilograms during the first twenty-four hours coinciding with the onset of severe glycosuria. Ketonuria appeared on the fourth day and gradually increased in severity. There was a reduction of 860 mils (23%) in the total blood volume, which was due entirely to a 36% decrease in plasma volume. In spite of a loss of five kilograms in weight the blood volume was reduced from 60 to 52 mils per kilogram, and the plasma volume from 38 to 26 mils per kilogram. The hæmatocrit and serum protein figures were increased 30% and 21% respectively. There was a prompt recovery within eight hours following the intravenous administration of 4,000 mils of 5% glucose solution in normal saline solution, insulin and sodium bicarbonate, and forced fluids by mouth. In the second subject there was also a pronounced fall in the venous pressure. This fall may well explain the cause of the peripheral circulatory collapse often seen in severe diabetic acidosis. The reduction in blood volume in diabetic acidosis, particularly when associated with peripheral circulatory collapse, should indicate the immediate administration of fluid as an important step in treatment. Although there may be an increase in the concentration of serum proteins at the time of occurrence of the acidosis, the parenteral administration of normal saline solution or glucose may not be expected to increase the plasma volume immediately, since the fluid may be lost to dehydrated tissues. Blood transfusion, or better still, serum transfusion, should be especially helpful in the replacement of plasma volume and the relief of circulatory collapse.

BIOLOGICAL CHEMISTRY.

Amines in Blood.

D. RICHTER, M. LEE AND D. HILL (*Biochemical Journal*, November, 1941) describe a sensitive method for estimating amines in blood. The method is capable of detecting one part per million of β-phenylethylamine or iso-amylamine. Specimens of normal ox blood, guinea-pig blood and human blood contained less than one part per million of amines when tested by this method. The rate of detoxication of β-phenylethylamine administered intravenously in man was estimated, from observation of the time required for the blood pressure to return to normal, to be of the order of 26 milligrammes per kilogram of body weight per hour. The rate of detoxication of iso-amylamine administered intravenously in man was estimated from the rate of removal from the blood to be of the order of 60 to 250 milligrammes per kilogram of body weight per hour. The evidence suggests that the body has a considerable capacity in reserve for detoxicating amines. Previous assumptions that detoxication of amines is a relatively slow process are shown to be incorrect.

Blood Proteins.

R. SCHOENHEIMER, S. RATNER, D. RITTENBERG AND M. HEIDELBERGER (*Journal of Biological Chemistry*, July, 1942) have investigated the interaction of the blood proteins with dietary nitrogen. By the administration of isotopic amino-acids to actively immune rats and rabbits, it has been shown that antibody, like the other serum and body proteins, participates in metabolic reactions involving the uptake of dietary nitrogen. The distribution of isotopic nitrogen introduced into antibody and serum-protein fractions has been investigated by the isolation of amino-acids. The observed isotope concentrations indicate that amino-acid replacement and nitrogen transfer among individual amino-acids occur in antibody and normal serum proteins, in the same manner as has been indicated in organ proteins. The average rate of these reactions has been observed in antibody and normal serum proteins by following the rate of

replacement of isotopic nitrogen by normal nitrogen. It was found that the half-life of an antibody molecule is about two weeks, approximately the same as that of the average serum protein. Passively injected antibody has been shown to undergo no changes involving nitrogen replacement. In a rabbit already actively immune to another antigen, the absence of uptake of dietary nitrogen by the passive antibody is in pronounced contrast to the appearance of masked nitrogen in the active antibody.

Thyroxine Formation.

M. MORTON AND I. CHAIKOFF (*Journal of Biological Chemistry*, July, 1942) have used radioactive iodine ("I^{131}") to demonstrate the conversion of iodide to thyroxine and diiodotyrosine by surviving slices of thyreoid gland obtained from the rat, dog and sheep. Varying quantities of thyreoid tissue were placed in bicarbonate-Ringer's solution containing small amounts of "I^{131}". Tracer amounts of "I^{131}" were added to this solution as iodide. At the end of three hours the distribution of "I^{131}" among iodide, diiodotyrosine and thyroxine in the tissue *plus* its surrounding medium was 1:6:1. In three hours as much as 12% of the added iodide was found as thyroxine and as much as 70% as diiodotyrosine. The ability of the slices to convert iodide to thyroxine and diiodotyrosine was greatly reduced when they were minced and was almost completely lost when they were pulverized.

Plasma Proteins.

I. KOPP (*Journal of Laboratory and Clinical Chemistry*, May, 1942) reports that the fever caused by artificially induced malaria results in considerable changes in the plasma proteins consisting of a rapid and pronounced drop in the albumin content and fluctuations in globulin and fibrinogen content. Termination of malarial fever by quinine is followed by a rapid return to normal values. Fever produced by typhoid vaccine and artificial means (inductotherm) causes only slight fluctuations in the plasma protein fractions. The more pronounced reduction in albumin during malaria may be due in part to the greater amount and the more rapid recurrence of fever. The infectious process *per se* present in malaria is probably the most important factor in interfering with the synthesis of albumin in the liver even though dietary intake appears adequate. The increases in globulin are greater during malaria than during fever induced by typhoid vaccine or artificial means. The presence of an infectious process and the destruction of red cells during malaria account for the great increases in globulin. Fibrinogen is increased during malaria and typhoid vaccine fever. The progressive fall in fibrinogen content which occasionally occurs during malaria indicates probable liver damage.

Manganese Deficiency in the Rat.

P. D. BOYER, J. H. SHAW AND P. H. PHILLIPS (*The Journal of Biological Chemistry*, April, 1942) produced pronounced manganese deficiency in the rat by feeding low manganese diets to animals weaned without access to manganese. This deficiency resulted in definitely impaired growth in both male and female rats. In the manganese deficient female, œstrus cycles were irregular or absent and there was a marked delay in the opening of the vaginal orifice; the animals were unable to reproduce. In the male rat, there were testicular degeneration and complete sterility due to lack of production of spermatozoa. No histological abnormalities were detected in the adrenal, kidney, pituitary, thyreoid or ovary of rats deficient in manganese. Contrary to the findings of earlier workers, these studies showed that manganese was not necessary for the synthesis of ascorbic acid. Enzyme studies showed that in the liver of the deficient rats, there was a reduction in concentration of arginase; no essential change was found in the activity of the intestinal dipeptidases.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Western Australian Branch of the British Medical Association was held on August 19, 1942, at the Perth Hospital, DR. J. A. LOVE, the President, in the chair.

Treatment of Casualties in Forward Areas.

MAJOR E. KYLE read a paper entitled "The Treatment of Wounded in Forward Areas" (see page 459).

DR. D. R. C. WILSON, M.B.E., said that Major Kyle's paper was of particular interest to one who had worked at the source of the medical stream of evacuation—the regimental aid post. Such a paper accentuated the need for adequate treatment, starting early. As well as discussing several matters that had been brought up, Dr. Wilson wished as a contrast to dilate a little on some of the treatment of casualties prior to their arrival at the casualty clearing station or even at the dressing station in another theatre of war. Often a life or a limb could be saved by simple procedures carried out well forward, at the regimental aid post.

With regard to the administration of morphine, Dr. Wilson said that he fully agreed that adequate dosage was most necessary; in fact it was of first importance, and morphine should be given as early as possible. Almost all casualties should receive morphine, and one-third of a grain was the minimum dose, half a grain or even more being given in the more severe cases. He could well remember giving one casualty with a mutilated foot one grain of morphine in one and a half or two hours, and the patient was still in severe pain. Another casualty brought in with a perforating gunshot wound of the abdomen, cold and grey, *in extremis*, with almost no pulse, was given half a grain of morphine, became warm, and was left. On inspection in half an hour he had picked up considerably; he was given priority of transport, and arrived at the casualty clearing station via the main dressing station in good time. Dr. Wilson considered that the patient, without his early dose of morphine, would have died before his arrival at the main dressing station, which at that time was approximately ten miles to the rear. Dr. Wilson also considered the intravenous use of morphine to be unnecessary, and he thought its effect was more transient.

Referring to tourniquets, Dr. Wilson said that they were painful and shock-producing, and they could nearly always be dispensed with. By the application of one or more hæmostats, which were left *in situ*, the casualty could go back to the surgical post untouched. To attempt to tie off vessels by means of ligatures with hands filthy with blood and grime was to court disaster; but artery forceps could be kept sterile, and the touched part of the handles could as a rule be kept in position well away from the wound edge.

Dr. Wilson went on to refer to dressings. He said that had bandaging had been mentioned, and in his opinion the reason was not hard to find. The Army shell dressing should be redesigned. In many cases the shell dressings applied by the stretcher bearers were quite inadequate in size, and on the casualty's arrival at the regimental aid post the dressings had often moved well out of position. The French had varying sizes of dressings, from about four inches square to about fifteen inches square; they were excellent. Dr. Wilson said that their own method at the regimental aid post was to keep a roll of dressing gauze about nine inches wide in a closed pannikin of freshly made flavine solution, and to cut off with forceps and scissors kept always in spirit and "Lysol" the required amount for each wound. This method was quite satisfactory, and a supply of flavine was always to hand; he thought that that must inhibit some bacterial growth. He considered that really wide bandages and triangular bandages in large quantities were a necessity. Moreover, large cotton wool pads to cover an extensive area overcame much of the difficulty of keeping dressings in place; that in turn must reduce sepsis.

With regard to splints, Dr. Wilson said that immobilization had been criticized. The Thomas splint had been much advocated and was certainly a proven splint; but it had to be applied efficiently. There were many stories of pressure sores from the extension and of rotation and sagging. He had himself seen a patient in agony due to a badly applied leg Thomas splint, and the patient had travelled only a few miles by ambulance. One Australian casualty clearing station with much action experience had made a plea for more simple splinting in forward areas by the use of the sound lower limb as a splint for its injured mate, and by the use of the stretcher and blankets for additional immobilization. Immobilization of the injured upper extremity against the body with no other splinting had also been advocated by the same casualty clearing station. Dr. Wilson thought that this suggestion had much to commend it, as in forward aid posts there was often a shortage of satisfactory bandages, and the duress and necessary haste tended to result in the

application of the Thomas splint without the necessary efficiency. These facts also illustrated the necessity of thorough inspections of applied splints at advanced dressing stations and main dressing stations on the way back to the casualty clearing station. This could not always be carried out satisfactorily without the unloading of the patients from the ambulance.

Dr. Wilson went on to discuss shock. He said that not much could be done in the way of resuscitation in the field at the regimental aid post in mobile warfare, other than by the use of the valuable expedients of morphine, heat, fluids and priority of transport. These fundamentals could easily be missed when haste was necessary. The time taken from the front line to the casualty clearing station varied according to the theatre of war and the terrain. At Tobruk it appeared that six to twelve hours was the evacuation time back to surgical treatment, and this was considered just within good surgical limits. In Dr. Wilson's experience in Syria it was often a matter of six to twelve hours from the line to the regimental aid post and frequently another twelve hours from the regimental aid post to the casualty clearing station. In this terrain "stretcher carries" were sometimes indescribable, and unfortunately casualties could sometimes be collected only under the cover of darkness. In one case a neighbouring battalion from necessity had at their disposal forty field ambulance stretcher bearers to get their casualties back to the regimental aid post in from six to ten hours. Inspection of the country made one realize that even this was only the result of superhuman effort. After arriving at the regimental aid post the casualties always had to be evacuated back with the minimum of delay, and it was found that the only way to achieve this was for ambulances to come right forward to the regimental aid post and to dispense with a further time-wasting stretcher carry back to a wagon loading post. When the casualty clearing station was fifty miles and more to the rear, it could be seen that methods were necessarily unlike those employed in the more or less static Tobruk defence. The field ambulance acted in the conventional manner, and the unloading and resuscitation of many casualties became necessary. It was difficult to assess the condition of a casualty by mere inspection in a loaded ambulance. With longer distances to travel, resuscitation was of great importance, and much might be done by the field ambulance, both at the advanced dressing station and especially at the main dressing station, by transfusion of either whole blood or plasma according to necessity. The time factor in such a campaign brought up the question whether a surgical team should go forward to the main dressing station. Many appeared to be much against it; but where there was reasonable security, Dr. Wilson thought that much good could be done by such a surgical team well forward. The only other alternative to minimize the time lag in evacuation to the surgical post was the development of aerial ambulance transport for the more serious casualties.

With reference to chemotherapy, Dr. Wilson said that although the acute fulminating septic wound appeared to be infrequent and the course of gas gangrene appeared to be unaffected by chemotherapy, a supply of sulphanilamide or sulphathiazole for oral use with each field dressing should be valuable. This already appeared to be the practice amongst the Americans. Application of the powder to wounds at the regimental aid post would be helpful; but Dr. Wilson thought that it would be wasteful unless used when *débridement* could be undertaken. It would usually be impossible to infiltrate the wound thoroughly in the field.

Speaking of foreign bodies, Dr. Wilson said that the subject of their removal appeared to be somewhat contentious. He had himself noted several men who were sent back to the line with small foreign bodies left *in situ*, which very soon gave trouble by the onset of sepsis when the driving was hard. In conclusion, Dr. Wilson said that he was afraid that he had discussed only those features which entered into his own experiences as a regimental medical officer. To criticize technique in the operating theatre at the casualty clearing station and the after-treatment was beyond his competence.

Naval, Military and Air Force.

CLINICAL MEETING AT 2/11 AUSTRALIAN GENERAL HOSPITAL.

A CLINICAL meeting was held at the 2/11 Australian General Hospital in the field on August 7, 1942. Patients were shown by members of the medical staff of the hospital, and visitors included medical officers from neighbouring military hospitals and units and local medical practitioners.

Macrocytic Anæmia following Recurrent Hepatitis.

LIEUTENANT-COLONEL K. B. NOAD showed a patient, aged thirty-six years, suffering from macrocytic anæmia following recurrent hepatitis. In August, 1941, the patient had complained of diarrhœa associated with the passage of blood and mucus of eight or ten weeks' duration. In October he complained of a mild attack of jaundice of seven to ten days' duration. In December, 1941, he had a second attack of jaundice; the onset was acute, and was accompanied by a rise in temperature and a shivering attack. The jaundice was again mild. In May, 1942, the patient's appetite declined and he did not feel well. On June 12 he had fever and pain in the joints and shoulders, especially the right shoulder. On June 16 the onset of a third attack of jaundice was noted, and on June 23 he had a rigor and a rise of temperature to 104° F.; no increase in the depth of jaundice or the severity of his symptoms followed. From June 23 to 30 he complained of a "bloated" feeling and constipation.

On July 3 the patient was admitted to the 2/11 Australian General Hospital. On examination, he was seen to have a gaunt face, earthen-coloured skin and no icterus. Neither the liver nor the spleen was palpable or tender. No abnormality was detected in any other system. Several investigations were undertaken. The results of blood counts made from time to time are shown in Table I. The fragility of the erythrocytes varied from 0·42% to 0·32%. On six occasions examination of blood films failed to reveal malarial parasites. A fractional test meal examination revealed complete achlorhydria. The blood serum failed to react to the Kline test. An X-ray examination of the chest and fluoroscopy were carried out; the diaphragm appeared normal and moved evenly, and the heart was somewhat enlarged. Examination of the stools failed to reveal *Entamœba histolytica*. A sigmoidoscopic examination revealed no abnormality.

Lieutenant-Colonal Noad said that he was showing this patient for two reasons. The first was that recurrence of hepatitis had not been common in his experience. He said that he had notes of 167 cases encountered in Alexandria

TABLE I.

Date.	Erythrocytes per Cubic Millimetre.	Hæmoglobin Value.	Colour Index.	Leucocytes per Cubic Millimetre.	Percentage of Reticulocytes.	Coagulation Time.
21/6/42	3,100,000	75%	1·2	5,500		
29/6/42[1]	3,000,000			6,000		
1/7/42[2]	3,500,000	75%	1·1	7,500	11·5	12 minutes.
10/7/42[3]	4,200,000	75%	1·1		4·2	
17/7/42[4]	4,500,000	88%		6,400	4·0	3 minutes.
24/7/42[4]	4,800,000	83%	1·0		1·0	
30/7/42[5]	5,000,000	97%			1·0	
7/8/42	5,200,000	105%		Less than 1% of the film normal.		

[1] Two cubic centimetres of "Campokon" given intramuscularly each day. This and the preceding count were made in the casualty clearing station.
[2] Two cubic centimetres of "Anahæmin" given intramuscularly each day.
[3] Two cubic centimetres of "Anahæmin" given every other day.
[4] "Anahæmin" given every day, as well as *Ferri et Ammonii Citras*.
[5] Treatment discontinued.

and drawn mainly from Tobruk, and in only one of these cases was there a history of a previous attack on active service. The second reason was that this type of anæmia, as far as he knew, had not appeared often. A case had been reported in THE MEDICAL JOURNAL OF AUSTRALIA of June 6, 1942, by Bonnin, in which severe and prolonged hepatitis was accompanied by a severe macrocytic anæmia. Lieutenant-Colonel Noad said that in the adult the liver acted as a storehouse of hæmopoietic principle absorbed from the alimentary tract, and also of any excess of iron in the plasma. In the average case of hepatitis, the degree of damage was not sufficient to interfere with this storage function; but in the case under discussion the third infection of the liver was sufficient to produce damage capable of interfering with the storage of hæmatinic principles. If it was true that the damage was cumulative, that fact indicated that the liver might take some months to recover completely after an attack of hepatitis. The achlorhydria in the case under discussion was probably coincidental and did not influence the production of anæmia. The possibility of an Addisonian anæmia uncovered by hepatitis was unlikely, in view of the age of the patient, the history and evidence of liver damage, and the maintenance of the blood picture in the absence of treatment.

Glossitis.

MAJOR G. R. WEIGALL showed a soldier suffering from glossitis of obscure origin. The patient was aged thirty-one years, and had been admitted to hospital on June 15, 1942. He had complained of soreness and ulceration of the tongue present for about nine months. Prior to that, since childhood he had had frequent digestive disturbances, with coating and redness of the tongue as a prominent feature. The condition had varied considerably, being much more painful at times when he had a gastro-intestinal derangement. Loss of appetite, vomiting and diarrhœa for some days or weeks at a time had occurred, and at such times his tongue became more swollen and painful. He had had no such exacerbation whilst under observation. He had been taking a normal adequate diet.

On examination, the tongue was seen to be swollen and red with deep fissures and enlarged papillæ over the anterior third. The submental and cervical glands were not enlarged, and general examination otherwise revealed no abnormality. The blood serum failed to react to the Kline test. A blood count revealed that the hæmoglobin value was 100%, that the leucocytes numbered 9,500 per cubic millimetre, and that they were distributed in the following manner: polymorphonuclear cells 50%, lymphocytes 35%, monocytes 11%, eosinophile cells 2%, and basophile cells 2%. No abnormality was detected in a blood film. A fractional test meal examination produced normal results. Material from a tongue fissure was subjected to cultural examination; *Staphylococcus albus*, Gram-negative bacilli and a mixture of other organisms were grown. On culture from emulsified tissue removed at biopsy a few colonies of contaminants only were grown. Examination of a section from a piece of a hypertrophied papilla removed at biopsy revealed hypertrophy and folding of the epithelial layer and increase of subepithelial tissue. The increase was held to be due mainly to proliferation of fibrous tissue, which was patchily infiltrated with mononuclear cells. These pathological findings gave no clue to the ætiology of the condition, except to suggest a non-specific chronic inflammation.

During the patient's stay in hospital his diet was liberally supplemented with foods containing vitamins, with fruit, with milk and with "Marmite". He was also given a course of injections of "Nicamide". He suffered fairly constantly from mild dyspeptic symptoms, which were not relieved by the ingestion of either alkaline powder or hydrochloric acid with meals; but there was a general tendency towards improvement, both in the local condition and in his general condition. For the last three weeks he had been in the convalescent depot, and a substantial improvement in the condition of the tongue was obvious; it was less swollen, red and fissured. He had gained about ten pounds in weight since his admission to hospital and had had some mild flatulant dyspepsia, but no acute gastro-intestinal symptoms.

COLONEL R. FOWLER said that the condition of the tongue might be due to a fungous infection, but that this possibility appeared to have been excluded by the investigations of the contents of the fissures. He thought that a scraping should be taken from the surface and spoke of the distinctions between leucoplakia and fungous infections.

LIEUTENANT-COLONEL E. D. AHERN expressed the view that considerable anatomical variations might be considered to be within normal limits, but agreed that this assumption would not explain the associated digestive symptoms in the case under discussion. He spoke of the possibility that a streptococcal infection might be a causative factor, and as no organisms of this nature had been grown by ordinary methods, he suggested that anaerobic culture might be of assistance. Lieutenant-Colonel Ahern suggested a course of sulphapyridine therapy in case the condition should be streptococcal.

Brachial Plexus Lesion and Cervical Rib.

Major Weigall's second patient was a soldier, who had a brachial plexus lesion and a cervical rib. He was aged thirty-four years, and had been a bootmaker all his life, prior to and since enlistment. He had had pain in the right arm for about seven months; this he had first noticed soon after an injury to the elbow region, which led to cellulitis, and for which the arm had to be carried in a sling. Weakness and tingling came on gradually during the next few weeks. This patient was not a heavy drinker and showed no symptoms or signs of *diabetes mellitus*. A faulty posture with dropping of the right shoulder had been noticed for some months, and for a year he had been aware that he could not carry weights on that shoulder so well as on the other.

On examination, loss of power was noted in all the movements of the limb, together with wasting affecting all muscle groups to some extent, but most apparent in those supplied from the lower cord of the brachial plexus. These muscles became easily fatigued after a movement had been repeated two or three times. Slight, variable loss of sensation was noted over the distribution of the ulnar nerve. An X-ray examination revealed an enlarged transverse process of the seventh cervical vertebra on both sides; the right was more enlarged than the left. No definite rib formation was obvious.

LIEUTENANT-COLONEL E. T. DOWNIE said that he considered that the anatomical peculiarity of the seventh cervical vertebra was a coincidence and not the cause of the condition, which he believed to be due to neuritis of obscure origin. He was of the opinion that the involvement of the deltoid muscle excluded cervical rib as the cause of the symptoms, and said that he had detected fibrillation in some of the affected muscles. Lieutenant-Colonel Downie had encountered a number of such cases in the Middle East, and was very interested in the condition. There had been some discussion among medical officers there as to whether it might be an atypical form of anterior poliomyelitis. He, however, regarded such lesions as due to some unrecognized toxic process possibly associated with dietetic deficiencies, and said that all the patients tended to make a complete recovery. He therefore advised against surgical measures, and said that the prognosis was good if physiotherapeutic measures and reeducation of muscles were carried out.

Periostitis of the Tibiæ and Fibulæ.

Major Weigall finally showed a soldier, aged thirty-four years, suffering from chronic periostitis of the tibiæ and fibulæ. He had been admitted to hospital on June 3, 1942. For two months he had complained of pain in both shins and ankles, worse on standing or marching, and lately so severe as to prevent him from doing so. There was no history of trauma or of previous disability. He was reported by his regimental medical officer to have œdema of both legs. This had decreased during rest prior to his admission to hospital, but at the time of his admission some slight pitting on pressure over the medial aspect of both tibiæ was still present, and tenderness to touch was noted all up the shaft of the bone. There was no loss of power in the limb, and no sensory changes had occurred. The deep reflexes were equal and active; the plantar reflexes were flexor in type. The cardio-vascular system was normal. A urine examination revealed no abnormality. No increase in temperature or pulse rate had occurred during the patient's stay in hospital.

On July 11, 1942, a radiological examination revealed diffuse symmetrical periostitis of both tibiæ and to a less extent of both fibulæ on the anterior and medial surfaces; the radiologist considered the pathology obscure, but suggested that the condition might be specific. An X-ray examination of the femora and humeri revealed no abnormality. The blood serum failed to react to the Kline test. The patient was given 0·3 gramme of "Novarsenobillon", and again the Kline test failed to produce a reaction. The Wassermann test also failed to produce a reaction. Nothing in the nature of a septic focus was found in the patient's mouth or throat.

A blood examination was made. The hæmoglobin value was 100%; the erythrocytes numbered 5,400,000 and the

leucocytes 9,000 per cubic millimetre; the blood film was normal in appearance.

The patient had no treatment other than rest in bed, and his condition slowly improved. The œdema was no longer demonstrable after a fortnight, and the tenderness had decreased; but he still had aching pain in the legs, particularly if they were allowed to be dependent for a time.

Lieutenant-Colonel Ahern said he thought, on the one hand, that the condition might be an early stage of Paget's disease and suggested an X-ray examination of the skull; on the other hand, however, the appearances were so suggestive of syphilitic infection that he would not put such a diagnosis right out of mind, in spite of the absence of reaction to the Kline and Wassermann tests.

Osteomyelitis of the Clavicle and Staphylococcus Aureus Septicæmia.

LIEUTENANT-COLONEL G. G. L. STENING showed a soldier suffering from osteomyelitis of the clavicle with *Staphylococcus aureus* septicæmia. The patient, aged eighteen years, had been admitted to hospital on June 28, 1942. He was extremely ill, "toxic" in appearance, pale and dehydrated. His temperature was 100° F., his pulse rate was 120 and his respiration rate was 24 per minute. On his admission to hospital his condition became extremely bad, and it looked as if he would die very soon. "Coramine" was administered, and his condition improved somewhat. The following history was elicited: On June 11, 1942 (approximately) he became ill with shivering and pain round the back. Next morning he was again "shivery", and thought he could "work it off"; but he felt weak, and reported sick. He was then sent to a hospital, and after one week there his left knee commenced to ache badly. About one and a half days later the left shoulder became painful, and soon afterwards his right knee and right shoulder became painful; to all of these joints hot packs were applied.

Examination on his admission to hospital on June 28 revealed that the tenderness in his left knee had gone, but that his right knee was still tender and that the pain in his shoulders seemed to be localized in his left sterno-clavicular region. His right shoulder was painful to move. Some periarticular swelling and tenderness were noted in the right knee, which was very painful on movement. The left sterno-clavicular region was swollen, fluctuant and tender. The other joints seemed normal. The spleen was palpable. The patient also had a bad cough with purulent sputum.

Under local anæsthesia the swelling was incised and pus was obtained, which appeared to come from the left sterno-clavicular joint. A smear revealed staphylococci, which later yielded a pure culture of *Staphylococcus aureus*. A blood count at this stage gave the following information: the erythrocytes numbered 4,500,000 per cubic millimetre and the hæmoglobin value was 65%; the leucocytes numbered 15,000 per cubic millimetre, 83% being polymorphonuclear cells, 10·5% lymphocytes, 5% monocytes, 0·5% basophile cells and 1% neutrophile myelocytes; no eosinophile cells were seen. Fairly severe toxic degeneration of the polymorphonuclear cells was obvious; this, together with the absence of eosinophile cells, suggested an indifferent prognosis. Occasional polychromasia and basophilic stippling of the erythrocytes were present.

Owing to the kindness of Dr. Deane Butcher, it was possible to obtain some sulphathiazole, and the patient was given ten grammes at 9.30 that night. Next morning he appeared better; he was given three grammes of sulphathiazole in the morning and again in the afternoon and evening. The pain in his knee and right shoulder had diminished. On June 30 he was given two grammes every four hours. On July 1 a further count revealed that the leucocytes numbered 20,000 per cubic millimetre; 83% were polymorphonuclear cells, 2% were neutrophile myelocytes, 9% were lymphocytes and 6% were monocytes.

The polymorphonuclear cells were mainly young; there were many staff cells and an occasional myelocyte. The toxic changes had to a large extent disappeared. Of the erythrocytes, there were an increased number with basophilia. Stippling was no longer present. There was a great improvement in the appearance of the blood film.

On July 1 and 2 the patient was very well. The sulphathiazole therapy was continued. On July 5 his temperature rose again, and 1·5 grammes of sulphathiazole were given every four hours. He still had purulent sputum, although examination of his chest gave little information. On July 8 two grammes of sulphathiazole were given every four hours. By July 10 his temperature was normal and sulphathiazole was given in doses of 0·5 gramme every four hours; its use was discontinued on July 11. His wound discharged freely for some days, but this soon ceased. His cough and sputum disappeared. An X-ray examination on July 31 revealed chronic osteomyelitic changes in the medial two-thirds of the left clavicle, with a suggestion of pathological fracture and sequestrum formation in the inner third.

CAPTAIN R. C. DENT asked what was the total dosage of sulphathiazole.

Lieutenant-Colonel Stening said that this was 69 grammes in fourteen days.

Traumatic Urethral Stricture.

Lieutenant-Colonel Stening then showed a patient suffering from a traumatic urethral stricture. He had been involved in a motor car accident on May 6, 1942, and had sustained a fracture of the pelvis in the region of the right ramus of the pubis and the ischium. The X-ray film revealed that the position of the fragments was good. He had also had some hæmaturia and retention of urine. His bladder was catheterized after the accident, and the next day a catheter was left in the bladder. Three days later the catheter was removed and he passed urine naturally. On May 12 a chest lesion with a pleuritic rub developed; this subsided by May 21. A further X-ray examination of the pelvis on June 15, 1942, revealed that the fragments were in good position.

On June 17, 1942, the patient was unable to micturate, and it was not possible to catheterize his bladder, so a catheter was inserted suprapubically. He was admitted to the 2/11 Australian General Hospital on June 29. On July 2 passage of bougies was attempted without success; an obstruction was revealed in the region of the membranous portion of the urethra. On July 8, under general anæsthesia, the suprapubic wound was opened and a metal bougie was passed down the urethra, and at the same time another was passed via the pelvis. The stricture was felt in the membranous portion of the urethra and appeared to be about a quarter of an inch thick. By manipulation aided by the insertion of a finger into the rectum the two points of the bougies were contacted, after which it was a simple procedure to dilate the stricture to take size 14/17 sounds. A rubber catheter was passed in a retrograde manner and left in the bladder with silk guides outside the wound. An indwelling catheter was inserted suprapubically and the wound was closed; the latter catheter was used for through-and-through irrigating purposes, and the bladder was kept empty by the attachment of the penile catheter to a suction apparatus. On July 14 the penile catheter was changed by the "rail-roading" method and on July 21 the catheters were removed. The patient was submitted to a daily passage of metal bougies for one week, although after the suprapubic wound had closed he was on some occasions unable to micturate normally without the passage of a catheter. There was no obstruction in the urethra, and the patient seemed to get a spasm which prevented him from emptying his bladder. However, as soon as he was given a mixture of bromide and belladonna, he passed urine in a normal and free manner for a time, and then lapsed. At the time of the meeting he could pass urine in a normal stream, but occasionally blocking occurred. It was now easy to pass sounds up to 11/13 in size.

Lieutenant-Colonel Stening considered the cause of the so-called spasm was that the patient had a flap in the urethra, which acted at times like a valve. Lieutenant-Colonel Stening proposed to pass sounds at regular intervals in the future.

DR. DEANE BUTCHER said that he had treated this patient after his accident, and described details of his treatment at that stage.

Hepatic Amœbiasis.

CAPTAIN M. L. EDWARDS showed a patient, aged thirty-six years, suffering from hepatic amœbiasis, who had been admitted to hospital on July 18, 1942, with a history of epigastric pain and vomiting present since April. The pain he described as "like a coil of barbed wire", sometimes passing from the epigastrium down the right side of the abdomen, sometimes between the scapulæ. The pain came in attacks lasting four or five days, and during this period it was constant. Between attacks he had several days of comparative comfort. During attacks of pain vomiting would occur at any time of day, but more particularly after meals. The vomitus usually contained bile. He had never been jaundiced. His appetite was capricious, and he lost any desire for food on beginning a meal.

He had suffered from diarrhœa, with watery motions containing slime, for five days early in July. Defæcation had

since been normal. Prior to enlistment he was a seaman in good health. He had served in the Middle East from November, 1940, to January, 1942, mainly in Palestine and Syria. During this time he suffered intermittently from diarrhœa; the motions often contained slime, and on one occasion blood was noticed. At no time did the diarrhœa appear severe enough to compel his admission to hospital. He had lost 21 pounds in weight in the past two years.

Physical examination revealed a thin man, of rather sallow complexion. The temperature remained normal after his admission to hospital. The edge of the spleen was palpable and tender. Generalized tenderness was present over the whole of the hypochondrium, and the liver edge was palpable and firm one and a half inches below the costal margin in the right nipple line. A sigmoidoscopic examination revealed that the mucosa generally was somewhat hyperæmic, with a fine granular appearance. Several areas, from half an inch to three-quarters of an inch in diameter, were pale and abnormally smooth; the appearance of two others suggested heaped-up granulation tissue, such as that found at the site of healing ulcers. In a blood film no malarial parasites were found. A blood count revealed that the leucocytes numbered 13,000 per cubic millimetre; 65% were polymorphonuclear cells, 30% were lymphocytes, 4% were monocytes, and 1% were eosinophile cells. The fæces were solid in consistency. No amœbæ or cysts were found on repeated examination before the institution of emetine therapy. Fluoroscopic examination revealed no elevation, distortion or limitation of movement of the diaphragm.

At the time of the meeting the patient showed great clinical improvement. Pain was much less and vomiting very infrequent. The spleen was no longer palpable. The liver edge was just palpable, and tenderness was greatly diminished in the right hypochondrium. A count showed that the leucocytes numbered 9,200 leucocytes per cubic millimetre of blood; 54% were polymorphonuclear cells, 35% were lymphocytes, 7% were monocytes, 3% were eosinophile cells, and 1% were basophile cells. The diagnosis of hepatic amœbiasis was considered probable in view of (i) the clinical appearance, (ii) the sigmoidoscopic evidence of preceding colitis and (iii) the leucocytosis. Emetine hydrochloride was therefore given as an intramuscular injection, in daily doses each of one grain, the course beginning on July 21, 1942. Captain Edwards said that in the future treatment of the patient it was proposed to administer a course of emetine bismuth iodide.

Lieutenant-Colonel Downie considered that the response to emetine had justified the diagnosis. He stressed the chronicity of amœbiasis.

Malaria with Anæmia.

Captain Edwards's second patient was a soldier, aged twenty-two years, suffering from malaria with anæmia. He had been admitted to hospital on July 25, 1942, following an initial attack of malaria, *Plasmodium vivax* having been found on the previous day. On his admission to hospital his symptoms had subsided, and he was feeling in his usual health. The patient had served in Syria from July, 1941, to January, 1942. He had had one attack of sandfly fever, but no known malaria. He was of pale and sallow complexion. The spleen was not palpable, and no other abnormality was found. A blood count was made on July 28, 1942. The erythrocytes numbered 2,800,000 per cubic millimetre of blood; pronounced anisocytosis was noted, microcytes and macrocytes being present in large numbers. Cells showing basophilic staining and basophilic stippling were common. The hæmoglobin value was 56%. No cause for the anæmia other than malaria was found. No evidence of worms or ova was found in the fæces.

Routine treatment for malaria was given, and in addition one drachm of iron and ammonium citrate (saturated solution) was administered three times a day. A blood count on August 6, 1942, revealed that the erythrocytes numbered 3,600,000 per cubic millimetre. Examination of a blood film revealed slight anisocytosis and an occasional red blood cell showing basophilia and very fine stippling. The hæmoglobin percentage had risen to 65.

Captain Edwards said that the patient was shown to illustrate two points: (i) the long latent period before benign tertian malaria was clinically manifest; (ii) the severe degree of anæmia associated with this latent infection.

Urinary Calculi.

MAJOR G. N. MORRIS showed a patient suffering from ureteric calculus. He commented on the frequency with which men suffering from urinary calculi had been admitted to the hospital during the past five weeks. He had had eight cases in a ward of 60 beds. It was possible that this high incidence was related to service overseas in a semi-tropical climate, though the soldier shown had lived in Melbourne all his life, had never been overseas, and had been in Queensland for only five weeks.

MAJOR E. R. CRISP then showed the X-ray films of this patient and of others of Major Morris's patients. Major Crisp showed by these films the demonstration of urinary calculi by plain X-ray films, by X-ray films taken with opaque catheters in the ureter, by excretion pyelograms and by retrograde pyleograms, and discussed the differential diagnosis of urinary calculi from a radiological viewpoint.

X-Ray Films in Various Conditions.

Major Crisp also showed X-ray films of the following lesions: (i) widespread Schmörl's disease of the vertebral bodies; (ii) an amputation stump after section through the upper third of the leg; (iii) a forearm from which the middle third of the ulna was absent.

The second and third sets of X-ray films had been taken in Syria; the patients were members of the Australian Imperial Force, each of whom had over twelve months' active service and had been able efficiently to fulfil his duties of truck driving and general work respectively. The films were shown to demonstrate the difficulties of assessing the capacity as soldiers of men appearing before medical boards.

Pathological Exhibit.

CAPTAIN F. R. MAGAREY demonstrated blood films from the patients shown by Lieutenant-Colonel Noad and Captain Edwards.

APPOINTMENTS.

THE following appointments have been promulgated in the *Commonwealth of Australia Gazette*, Number 294, of November 5, 1942.

ROYAL AUSTRALIAN AIR FORCE.

Citizen Air Force: Medical Branch.

The following are appointed to commissions on probation with the rank of Flight Lieutenant with effect from the dates indicated: Douglas Gordon, M.B., B.S. (6870), 22nd September, 1942, Joseph Donal Connellan, M.B., B.S. (6866), 24th September, 1942, Wilfred John Simmonds, B.Sc., M.B., B.S. (6864), George Andrew Robbie, M.B., B.S. (6865), 26th September, 1942, Edward William Gibson, M.B., B.S. (6875), Thomas James Lowe, M.B., B.S. (6876), James Gordon Opie, M.B., B.S. (6846), 26th September, 1942.—(Ex. Min. No. 174—Approved 29th October, 1942.)

The probationary appointments of the following Flight Lieutenants are confirmed: R. J. C. Kristenson (4418), T. P. Mahon (1455), J. Barnes (4590), J. M. Barrett (4593), C. F. Bernard (4592), L. A. Commins (4588), M. T. Drummond (4589), A. W. McLaren (4591), B. T. Mayes (4848), A. R. McCay (4371), R. M. Cloutier (4595), J. D. I. Grant (4596), C. C. Munro (4594).

CASUALTIES.

ACCORDING to the casualty list received on November 10, 1942, Major John Finch Akeroyd, A.A.M.C., of Frankston, Victoria, previously reported missing, is now reported missing, believed prisoner of war.

Australian Medical Board Proceedings.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act*, 1938-1939, of New South Wales, as duly qualified medical practitioners:

Himmelhoch, Elizabeth, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Hing, Norman Sidney, M.B., B.S., 1942 (Univ. Sydney), Sydney Hospital, Sydney.

Hipsley, Percy Donald, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Hughes, Frank Cameron, M.B., B.S., 1942 (Univ. Sydney), Saint George District Hospital, Kogarah.
Hume, Kevin Francis Hamilton, M.B., B.S., 1942 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst.
Jeffery, Jack Albert Houston, M.B., B.S., 1942 (Univ. Sydney), District Hospital, Parramatta.
Jones, Allan Hackett, M.B., B.S., 1942 (Univ. Sydney), Prince Henry Hospital, Little Bay.
Kendall, Richard Bruce, M.B., B.S., 1942 (Univ. Sydney), District Hospital, Balmain.
Kerridge, John Charters, M.B., B.S., 1942 (Univ. Sydney), Sydney Hospital, Sydney.
Laing, John, M.B., B.S., 1942 (Univ. Sydney), Sydney Hospital, Sydney.
Lane, Alan Ingram, M.B., 1942 (Univ. Sydney), Sydney Hospital, Sydney.
Lane, Raymond Mervyn, M.B., B.S., 1942 (Univ. Sydney), District Hospital, Cessnock.
Lawrence, Lorraine Cecile, M.B., B.S., 1942 (Univ. Sydney), 11, Milray Avenue, Wollstonecraft.
Lee, Charles William Garnock, M.B., B.S., 1942 (Univ. Sydney), Sydney Hospital, Sydney.
Leggo, Hedley Oliver Orion, M.B., B.S., 1942 (Univ. Sydney), Sydney Hospital, Sydney.
Leighton, Isabel Emily, M.B., B.S., 1942 (Univ. Sydney), Saint George District Hospital, Kogarah.
Lilley, Ian Mitford, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Lowe, Thomas James, M.B., B.S., 1942 (Univ. Sydney), Royal South Sydney Hospital, Zetland.
MacCulloch, Thomas Harington, M.B., B.S., 1942 (Univ. Sydney), District Hospital, Balmain.
McDonogh, William Patrick, M.B., B.S., 1942 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Ross, Heather June Sylvia, M.B., B.S., 1942 (Univ. Sydney), District Hospital, Lithgow.
Moore, Howard Stewart, M.B., B.S., 1942 (Univ. Sydney), Sydney Hospital, Sydney.
Walton, Frank Westlake, M.B., B.S., 1942 (Univ. Sydney), 37, Morton Street, Wollstonecraft.

The undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Baker, Joan Helen Gertrude, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Blacker, Janie Una, M.B., B.S., 1939 (Univ. Sydney), 127, Milton Street, Ashfield.
Fowler, Noel Allison, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Kelf, Ian Lachlan, M.B., B.S., 1939 (Univ. Sydney), NX426 Captain I. L. Kelf, 7th Australian Casualty Clearing Station, Australia.
Norton, Horace George, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Rundle, Philip Alan, M.B., B.S., 1941 (Univ. Sydney), 22, High Street, Newcastle.
Stanley, Patricia Julie, M.B., B.S., 1941 (Univ. Sydney), Saint Joseph's Hospital, Auburn.

Books Received.

"Illustrations of Regional Anatomy", by E. B. Jamieson, M.D.; published in seven sections; Fourth Edition; 1942. Edinburgh: E. and S. Livingstone. Foolscap 4to.

"Gold from the Sea", by James Taylor; 1942. Sydney: Australasian Publishing Company, Proprietary, Limited. 8¼" × 5¼", pp. 271, with 17 illustrations. Price: 12s. 6d.

"Only the Stars are Neutral", by Quentin Reynolds; 1942. Sydney: Angus and Robertson, Limited. London: Cassell and Company, Limited. 8¼" × 5¼", pp. 288. Price: 10s. 6d.

"Mental Nursing Simplified", by O. P. Napier Pearn, M.R.C.S., L.R.C.P., D.P.M.; Third Edition; 1942. London: Baillière, Tindall and Cox. 6¼" × 4¼", pp. 339, with illustrations. Price: 6s.

Diary for the Month.

Nov. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Nov. 26.—South Australian Branch, B.M.A.: Branch.
Nov. 26.—New South Wales Branch, B.M.A.: Branch.
Nov. 27.—Tasmanian Branch, B.M.A.: Council.
Nov. 27.—Queensland Branch, B.M.A.: Council.
Dec. 1.—New South Wales Branch, B.M.A.: Executive and Finance Committee. Organization and Science Committee.
Dec. 2.—Western Australian Branch, B.M.A.: Council.
Dec. 3.—South Australian Branch, B.M.A.: Council.
Dec. 3.—New South Wales Branch, B.M.A.: Special Groups Committee.
Dec. 8.—New South Wales Branch, B.M.A.: Ethics Committee.
Dec. 8.—Tasmanian Branch, B.M.A.: Branch.
Dec. 10.—New South Wales Branch, B.M.A.: Branch.
Dec. 11.—Queensland Branch, B.M.A.: Annual Meeting.
Dec. 15.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Dec. 18.—Queensland Branch, B.M.A.: Council.
Dec. 25.—Tasmanian Branch, B.M.A.: Council.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

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